

REPORT
OF THE
HEALTH DEPARTMENT
OF
THE PANAMA CANAL
FOR THE
CALENDAR YEAR
1922

H. C. FISHER

Colonel, Medical Corps, United States Army
Chief Health Officer

Gift of the Panama Canal Museum

THE PANAMA CANAL PRESS
MOUNT HOPE, C. Z.
1923

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HEALTH DEPARTMENT.

OPERATION.

Operating under the direction of the Governor of The Panama Canal. Maintained from funds designated for sanitation in Panama Canal appropriations and revenues derived from its own operations. It exercises jurisdiction in health matters over the Canal Zone and the cities of Panama and Colon, Republic of Panama, and also co-operates with the Panamanian Government in health matters in other parts of the Republic.

LETTER OF TRANSMITTAL.

THE PANAMA CANAL,
HEALTH DEPARTMENT,
BALBOA HEIGHTS, C. Z., May 16, 1923.

Col. JAY J. MORROW,
*Governor, The Panama Canal,
Balboa Heights, Canal Zone.*

SIR: I have the honor to submit the following report of the operations of the Health Department for the year 1922.

Respectfully,

H. C. FISHER,
Chief Health Officer.

ORGANIZATION.

The organization of the health department consists of:
Chief Health Office, Balboa Heights.

Division of Hospitals and Charities—

Ancon Hospital, Ancon.
Colon Hospital, Colon.
Corozal Hospital, Corozal.
Santo Tomas Hospital, Panama, R. P.
Palo Seco Leper Colony.

Dispensaries at—

Colon Hospital.
Gatun.
Pedro Miguel.
Ancon Hospital.
Balboa.

District Dentists at—

Cristobal.
Gatun.
Pedro Miguel.
Ancon.
Balboa.
La Boca.

Division of Sanitation—

Health Office, Panama.
Health Office, Cristobal, Colon.

Sanitary Districts—

Northern District; Office, Gatun.
Southern District; Office, Ancon.
Ancon-Balboa District; Office, Ancon.

Division of Quarantine—

Chief Quarantine Office, Balboa Heights.
Quarantine Station, Cristobal, Colon.
Quarantine Station, Balboa.

PERSONNEL.

(December 31, 1922.)

CHIEF HEALTH OFFICE.

Balboa Heights.

Col. H. C. Fisher, U. S. Army, Chief Health Officer.

Dr. D. P. Curry, Assistant Chief Health Officer.

Mr. A. L. Fessler, Office Assistant.

DIVISION OF HOSPITALS AND CHARITIES.

Ancon Hospital.

Col. L. T. Hess, U. S. Army, Superintendent.

Capt. James B. Anderson, U. S. Army, Assistant to the Superintendent.

Dr. T. W. Earhart, Chief of Surgical Clinic.

Dr. H. K. Tuttle, Assistant Chief of Surgical Clinic.

Dr. R. C. Connor, Chief of Medical Clinic.

Dr. W. W. Braithwaite, Assistant Chief of Medical Clinic.

Capt. Henry E. Keely, U. S. Army, Chief of Eye and Ear Clinic.

Dr. I. E. Hix, Assistant Chief of Eye and Ear Clinic.

Dr. L. S. Townsend, Chief of X-Ray Clinic.

Physicians.

Maj. Henry L. Krafft, U. S. Army.

Maj. Claude D. Holmes, U. S. Army.

Capt. James F. Brooke, U. S. Army.

Capt. James M. Bryant, U. S. Army.

Capt. John J. Moore, U. S. Army.

Capt. David L. Robeson, U. S. Army.

Capt. Julius G. Newgord, U. S. Army.

Capt. Earl H. Perry, U. S. Army.

Capt. Francis J. Moffatt, U. S. Army.

Internes.

Dr. Thomas C. Brewer

Dr. Ellett M. de Berry

Dr. Wilfred E. Muldoon

Dr. Curtis M. Roberts

Dr. Leslie E. Chappell

Dr. Lawrence B. Morris

Dr. Norman Leslie Reagan

Dr. Herman Seal

Board of Health Laboratory.

Dr. Louis B. Bates, Chief of Laboratory.

Capt. Virgil H. Cornell, U. S. Army, Pathologist.

Capt. Wesley C. Cox, U. S. Army, Bacteriologist.

Mr. J. E. Jacob, Chemist.

Corozal Hospital.

Dr. Louis Wender, *Superintendent.*
 Dr. Dillon G. O'Neil.
 Dr. David G. Sampson.

Colon Hospital

Maj. T. J. Leary, U. S. Army, *Superintendent*

Physicians.

Dr. Holland G. Hambleton. Dr. Wayne Gilder.
 Maj. Tom S. Mebane, U. S. Army. Capt. George J. Schirch.
 Capt. John M. Tamraz.

Internes.

Dr. Thomas H. Brownrigg. Dr. Edwin B. Rice.
 Dr. Joseph A. Kasper.

Santo Tomas Hospital (Panama).

Maj. E. A. Bocock, U. S. Army, *Superintendent.*

Physicians on Panama Canal Roll.

Dr. Roy R. Jones. Dr. Lynn W. Elston.
 Dr. William L. McNamara.

Palo Seco Leper Colony.

Mr. F. D. Tucker, *Superintendent.*
 Dr. Philip Horwitz, *Attending Physician.*

Cristobal-Colon Dispensary.

Dr. Holland G. Hambleton, *District Physician.*

Gatun Dispensary.

Dr. James A. Grider, *District Physician.*

Pedro Miguel Dispensary.

Dr. William B. Meares, *District Physician.*

Balboa Dispensary.

Dr. James S. Vance, *District Physician.*
 Dr. Littleton O. Keen.
 Dr. George Eugene.

Ancon Dispensary.

Dr. Walter K. Olson, *District Physician.*
 Dr. H. G. Bickford.

DIVISION OF SANITATION.

Panama Health Office.

Dr. Henry Goldthwaite, Health Officer.

Mr. J. M. Carpprow, Sanitary Inspector.

Mr. C. L. Pierce, Sanitary Inspector.

Mr. E. F. Quimby, Sanitary Inspector.

Dr. H. A. Lewis, Vaccinator.

Dr. Ira C. Mattatall, Supervising Veterinarian and Meat Inspector.

Cristobal-Colon Health Office.

Dr. Jesse L. Byrd, Health Officer.

Mr. T. A. Leathley, Sanitary Inspector.

Mr. I. W. Pickett, Sanitary Inspector.

Mr. M. M. Seeley, Sanitary Inspector.

Dr. F. F. Dowd, Veterinarian and Meat Inspector.

Dr. W. F. Gross, Veterinarian and Meat Inspector.

Canal Zone Sanitation.

Mr. C. H. Bath, Sanitary Inspector, Northern District, Gatun.

Mr. Geo. L. Willett, Sanitary Inspector, Southern District, Ancon.

Mr. John P. Corrigan, Sanitary Inspector, Ancon-Balboa District
Ancon.

Mr. J. L. Tolar, Sanitary Inspector (Relief), Pedro Miguel.

DIVISION OF QUARANTINE.

Chief Quarantine Office

Balboa Heights.

Surgeon W. C. Rucker, U. S. P. H. S., Chief Quarantine Officer.

Cristobal-Colon Quarantine, Cristobal, C. Z.

Dr. C. A. Hearne, Quarantine Officer.

Dr. William J. Burke.

Dr. F. L. Alexaitis.

Balboa-Panama Quarantine, Balboa, C. Z.

Dr. John D. Odom, Quarantine Officer.

Dr. Philip Horwitz.

Dr. S. S. Irvin.

VITAL STATISTICS.¹

EMPLOYEES.

The average number of employees on the rolls of The Panama Canal and the Panama Railroad, for the year was 10,447, as compared with 14,389 for 1921, and 20,673 for 1920:

The total admission rate to hospitals and quarters was 489.61 as compared with 620.33 in 1921, and 671.84 in 1920. For disease alone the admission rate to hospitals was 145.59, as compared with 180.35 in 1921, and 183.91 in 1920. The total admission rate to hospitals only, was 174.50, as compared with 211.20 in 1921, and 221.35 in 1920. (*See Chart No. 1.*)

The total death rate was 6.89, as compared with 6.46 in 1921, 8.70 in 1920, 7.23 in 1919, 8.11 in 1918, 7.09 in 1917, 6.03 in 1916, 5.77 in 1915, and 7.04 in 1914. The death rate from disease alone was 6.13, as compared with 5.70 in 1921, 7.40 in 1920, and 6.20 in 1919. (*See Chart No. 2.*)

The constantly noneffective rate from all causes was 14.81 as compared with 13.96 in 1921, and 14.87 in 1920. (*See Chart No. 3.*)

The admission rate for malaria, to both hospitals and quarters, was 16.85, as compared with 14.94 in 1921, 19.40 in 1920, and 31.07 in 1919. The noneffective rate for malaria was 0.46, as compared with 0.33 for 1921, 0.45 for 1920, and 0.99 for 1919. (*See Charts Nos. 4, 5, and 6.*)

The admission rate for typhoid fever was 0.38, as compared with 0.28 in 1921, 0.24 for 1920, and 0.17 for 1919. No deaths occurred from typhoid fever among employees during the year.

The 5 diseases causing the highest number of hospital admissions, with their rates, were as follows:

	1921.		1922.	
	Ad-missions.	Rate.	Ad-missions.	Rate.
Venereal diseases.....	310	21.54	191	18.28
Malaria.....	214	14.94	176	16.85
Diseases of the eyes and their annexa.....	104	7.23	60	5.74
Tuberculosis (various organs).....	38	2.64	34	3.25
Nephritis (chronic and acute).....	25	1.74	28	2.68

The 5 diseases causing the highest number of deaths, with their rates, were as follows:

	1921.		1922.	
	Deaths.	Rate.	Deaths.	Rate.
Tuberculosis (various organs).....	11	0.76	12	1.15
Organic diseases of the heart.....	14	.97	9	.86
Cerebral hemorrhage (apoplexy).....	6	.42	6	.57
Cancer (various organs).....	4	.28	6	.57
Nephritis (acute and chronic).....	9	.63	4	.38

¹ All rates given are computed as annual per 1,000.

EFFECTS OF RACE.

The admission rate to hospitals and death rate from disease, for white employees, were 179.70 and 3.54, respectively, as compared with 124.54 and 7.09 for black employees.

The admission rate to hospitals and quarters for malaria was 23.35 for white employees, as compared with 15.75 for black employees.

The death rate from disease for American employees was 3.27 as compared with 2.43 for 1921, and 3.32 for 1920.

CANAL ZONE.

EMPLOYEES AND NONEMPLOYEES.

From an average population of 31,098 in the Canal Zone, there was a total of 254 deaths during the year. Of these, 220 deaths were from disease, giving a rate of 7.08, as compared with 6.72 for 1921, and 7.68 for 1920.

The death rate from tuberculosis was 0.74, as compared with 0.64 for 1921, and 1.02 for 1920. Tuberculosis caused 10 per cent of all deaths from disease during the year.

There were 691 live births reported during the year, giving a birth rate of 22.22. (See Table VII.) Of these 242 were white, and 449 were black. Of the total births reported, 4 per cent were stillbirths.

Deaths among children under 1 year of age, from all causes totaled 64, of which 10 were white, and 54 were black, giving an infant mortality rate, based on the number of births reported for the year, of 41.32 for white, and 120.27 for black children, with a general average of 92.62 for 1,000 births.

Of the total deaths, 25 per cent occurred among children under 1 year of age, and 40 per cent among children under 5 years of age.

Below is a table showing the death rates for the Canal Zone from 1905 to 1922, inclusive, from all causes among employees and non-employees.

Year.	Popula- tion.	Deaths.	Rate per 1,000.	Year.	Popula- tion.	Deaths.	Rate per 1,000.
1905.....	23,463	828	35.29	1915.....	31,496	410	12.83
1906.....	34,095	1,700	49.86	1916.....	31,447	343	10.91
1907.....	54,036	1,708	31.60	1917.....	33,044	328	9.93
1908.....	67,146	1,273	18.95	1918.....	33,803	286	8.49
1909.....	76,900	1,025	13.33	1919.....	32,366	247	7.63
1910.....	86,465	1,251	14.47	1920.....	27,459	242	8.81
1911.....	90,434	1,385	15.32	1921.....	31,377	236	7.52
1912.....	79,279	1,129	14.24	1922.....	31,098	254	8.17
1913.....	61,700	1,047	16.97	.....	.....	.....	.....
1914.....	46,379	710	15.31	.....	.....	.....	.....

PANAMA CITY.

EMPLOYEES AND NONEMPLOYEES.

From an estimated population of 60,068 based on a census taken during the year 1920 by the Panamanian Government, there was a total of 1,279 deaths during the year. Of these, 1,241 were from disease, giving a rate of 20.66, as compared with 21.26 for 1921, and 20.60 for 1920.

The principal causes of death as compared with the preceding year, were as follows:

	Deaths in—	
	1921.	1922.
Tuberculosis (various organs).....	222	226
Pneumonia (broncho and lobar).....	223	168
Diarrhea and enteritis (including colitis).....	192	152
Nephritis (acute and chronic).....	109	135
Organic diseases of the heart.....	57	71
Cancer (various organs).....	40	58

The death rate from tuberculosis was 3.76, as compared with 3.67 for 1921, and 3.40 for 1920. Tuberculosis caused approximately 18 per cent of all deaths from disease during the year, as compared with 17 per cent in 1921, and 16 per cent in 1920.

There were 2,058 live births reported during the year, giving a birth rate of 34.26. Of the total births reported, 5 per cent were stillbirths.

There were 303 deaths among children under 1 year of age, giving an infant mortality rate, based on the number of births reported during the year, of 147.23.

Of the total deaths, 24 per cent occurred among children under 1 year of age, and 35 per cent among children under 5 years of age.

Below is a table showing the death rate in Panama City from 1905 to 1922, inclusive, from all causes, among both employees and non-employees:

Year.	Popula- tion.	Deaths.	Rate per 1,000.	Year.	Popula- tion.	Deaths.	Rate per 1,000.
1905.....	21,984	1,447	65.82	1914.....	53,948	1,863	34.53
1906.....	25,518	1,142	44.75	1915.....	60,373	1,810	29.98
1907.....	33,548	1,156	34.45	1916.....	60,778	1,765	29.04
1908.....	37,073	1,292	34.83	1917.....	61,074	1,714	28.06
1909.....	40,801	1,038	25.44	1918.....	61,369	1,314	21.41
1910.....	45,591	1,446	31.72	1919.....	61,369	1,211	19.74
1911.....	46,555	1,456	31.27	1920.....	60,500	1,297	21.44
1912.....	47,057	1,380	29.33	1921.....	60,500	1,336	22.09
1913.....	47,172	1,507	31.95	1922.....	60,068	1,279	21.29

COLON.

EMPLOYEES AND NONEMPLOYEES.

From a population of 31,393, a total of 445 deaths occurred during the year. Of these, 421 were from disease, giving a rate of 13.41, as compared with 16.25 for the preceding year, and 19.82 for 1920.

The principal causes of death, as compared with last year, follow:

	1921.	1922.
Tuberculosis (various organs).....	66	80
Nephritis (acute and chronic).....	39	42
Diarrhea and enteritis (including colitis).....	40	41
Pneumonia (broncho and lobar).....	39	31
Organic disease of the heart.....	29	30
Cerebral hemorrhage (apoplexy).....	12	20

The death rate from tuberculosis was 2.55, as compared with 2.30 for the preceding year, and 4.18 for 1920. Of the total deaths from disease, tuberculosis caused 19 per cent.

There were 759 live births reported during the year, giving a birth rate of 24.18. Of the total births reported, 7 per cent were stillbirths.

There were 106 deaths among children under 1 year of age, giving an infant mortality rate, based on the number of births reported during the year, of 139.66.

Of the total deaths, 24 per cent occurred among children under 1 year of age, and 38 per cent among children under 5 years of age.

Below is a table showing the death rate in Colon from 1905 to 1922, inclusive, from all causes, among both employees and nonemployees:

Year.	Popula- tion.	Deaths.	Rate per 1,000.	Year.	Popula- tion.	Deaths.	Rate per 1,000.
1905.....	11,176	553	49.48	1914.....	23,265	590	25.36
1906.....	13,651	703	51.42	1915.....	29,331	640	21.82
1907.....	14,549	571	39.24	1916.....	24,693	696	28.19
1908.....	15,878	418	26.32	1917.....	25,386	667	26.27
1909.....	17,479	396	22.65	1918.....	26,078	616	23.62
1910.....	19,535	514	26.31	1919.....	26,078	573	21.97
1911.....	19,947	527	26.42	1920.....	26,078	554	21.24
1912.....	20,174	493	24.44	1921.....	28,789	497	17.26
1913.....	20,232	489	24.17	1922.....	31,393	445	14.17

GENERAL REMARKS.

SANITATION.

The Division of Sanitation has continued its policy of maintaining a high standard of efficiency, yet always seeking more economical methods of achieving that result. Only by reason of having adopted this policy in advance of the present day of reduced appropriations and increased costs is it able to carry on its work without having to sacrifice any vital element necessary to protect the Canal Zone and the terminal cities from the spread of communicable diseases.

Especially in the anti-malaria work are the benefits of this policy apparent. As described in previous annual reports, the progressive installation of rock and tile subsoil drains through past years has greatly reduced the amount of labor formerly required on large areas of swamp and open earth ditches. Whereas at the maximum in 1919 there were employed in that work 7 sanitary inspectors and about 335 silver employees (mostly laborers), at the present time these have been reduced to 5 sanitary inspectors and 114 laborers; yet in spite of this reduction we have been able to extend the areas under sanitary supervision and, as a general rule, mosquito breeding is better controlled than ever before.

Of course, in a country like this, with varying meteorological conditions, the frequent occurrence of slides, dredging operations, and other features inseparable from the maintenance and operation of the Canal, from year to year new problems present themselves for attack and solution; yet these are but temporary incidents usually,

and are taken care of as their sanitary importance develops. Economies have also resulted from the improved use of oil and "larvacide" and from changes in various other phases of sanitation in the Canal Zone and in the cities of Panama and Colon—especially in the methods of garbage collection and disposal, street cleaning, inspections, etc. The sanitary inspector's office at Balboa was abandoned on October 1, and the sanitary inspectors of the Ancon-Balboa district and of the Southern District now jointly occupy the Ancon office, at which place is also located the larvacide factory and the concrete tile plant; this change made a saving of the cost of 1 clerk, a telephone, and other small charges.

Because of reduced forces the amount of permanent tile drainage installed during the dry season of 1922 was not so large as in some previous years, but still quite a bit was accomplished. It has been found best to keep the laboring forces at such a size as is required by the routine work of the wet season, and to employ these during the dry season and at other slack times on "permanent" work, or the elimination by tile of ditches and areas that require expensive maintenance during the rainy season; thus the number of laborers, can be progressively reduced or the size of the sanitated areas extended, and both have been done.

The two sanitary inspectors of the large Zone districts (the Southern District extends from the outer limits of Ancon and Balboa to Caimito pasture camp—20 miles north; the Northern District from the outer limits of Cristobal and Colon to Darien—25 miles south), have been provided with small automobiles in place of motorcycles, to enable them to cover their territories more efficiently and to transfer material and small gangs of men quickly; the motorcycles were unsatisfactory, as well as dangerous during the long wet seasons of the tropics.

The following table shows the number of malaria cases reported to the Chief Health Officer during the past 4 years: (*See also Chart 4.*)

Place of infection.	Employees.				Nonemployees (including military).				Total.			
	1919.	1920.	1921.	1922.	1919.	1920.	1921.	1922.	1919.	1920.	1921.	1922.
Canal Zone:												
Sanitated areas.	236	138	87	111	637	438	611	854	873	576	698	965
Cattle camps, etc.....	301	111	17	8	28	6	.....	.....	329	117	17	8
Unsanitated areas.....	21	18	18	12	47	17	42	48	68	35	60	60
Colon.....	70	20	9	5	69	21	23	52	139	41	32	57
Panama.....	62	30	17	4	119	70	50	102	181	100	67	106
Miscellaneous outside Zone.....	62	84	66	36	462	268	524	320	524	352	590	356
Totals.....	752	401	214	176	1,362	820	1,250	1,376	2,114	1,221	1,464	1,552
Annual rate per thousand.....	31	19	15	17	15	9	12	12	19	11	12	13

The cattle camps and plantations show but few cases this year because very little work was done in them during the past dry season,

save for bushing over and burning off pastures cleared in former years. No new clearings were made. Pasture clearing and cleaning are done largely by Panamanian labor, recruited for the dry season only, and these are always heavily infected with malaria at the time of employment. Owing to the nature and location of the work, no drainage and but little other anti-malaria work is done for them, but prophylactic quinine treatment is administered to all so engaged.

The cities of Colon and Panama report but few employees of the Canal as contracting malaria therein, but since the reduction of force on the Canal Zone, government quarters are available for nearly all employees, and relatively few of them now reside in Panamanian territory.

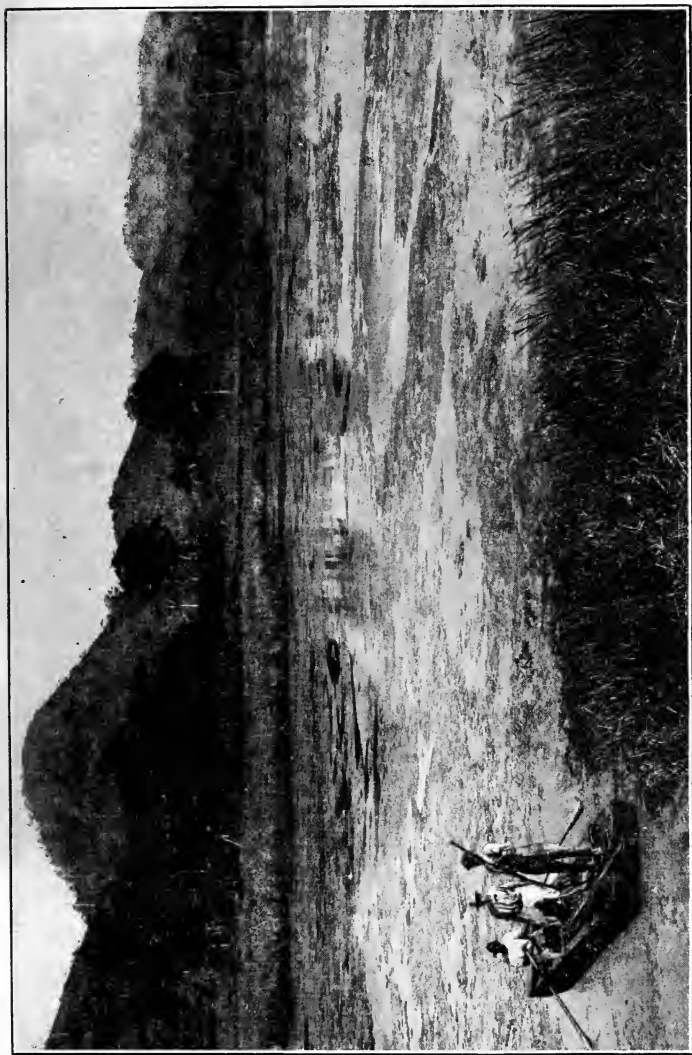
A large increase in the number of cases of malaria among nonemployees is shown, and this was expected and predicted as a result of the new policy of allowing unemployed laborers to return to the Zone to take up land for agricultural purposes. As explained in last year's report, it is impracticable to attempt to sanitize the country in which these settlers live. They are widely scattered over the available parts of the Zone, living in rude shacks near water courses and the lake, and are at all times exposed to malarial infection. About 1,500 licenses have been granted these settlers and it is estimated that 650 families are now living on the land. Each home inspected has been found to have a pit privy, not covered nor water-tight, but at least limiting the chances of intestinal infection. Many have learned to boil their drinking water and a few are undertaking drainage. Aside from malarial infection, the venture seems surprisingly successful in most instances. Ground has been cleared rapidly, and already many of the settlers have achieved what appears to be economic independence, at least of their standards, and are rearing their families in contentment. They will be perhaps in better circumstances than similar agriculturists in Panamanian territory. They have a certain amount of supervision by the American authorities, including the sanitation and police forces, and have, at least until they are able to pay for it, free medical service at the Panama Canal dispensaries and hospitals. An agronomist of the United States Department of Agriculture is now established on the Zone and his efforts will doubtless prove of value in teaching the settlers what crops to raise and how. In spite of the physical risk of living in practically unsanitated areas, and the present resulting increase of malaria in some of our own sanitated areas the net result of opening up the Zone to land settlers is a great gain to the community in increased and cheaper food supply, and in converting a large number of idle pauper blacks, former Canal employees, into self-supporting and self-respecting individuals. The large reservoir of available labor supply so established may also prove of supreme importance to the Canal in time of sudden emergency. No licenses are granted within a mile of Army posts and important residential sections of the Zone, but unfortunately laborers residing in Zone towns exchange visits with these settlers and it is believed that many cases of malaria among the employees and their families have resulted from this practice. This is especially true at Pedro Miguel and its two flanking negro settlements, Red Tank and Paraiso. Because of the many small lakes, seepage springs, streams and cattle pastures in the vicinity of these towns, the district has long been known to be more in-

fested with anopheline mosquitoes than some of the other sanitated areas. But with a practically uninfected population (due largely to extreme care in "follow up" or sterilizing treatment of every case of malaria on the Zone), and by careful attention to screening, that district had heretofore one of the smallest malaria rates on the Isthmus.

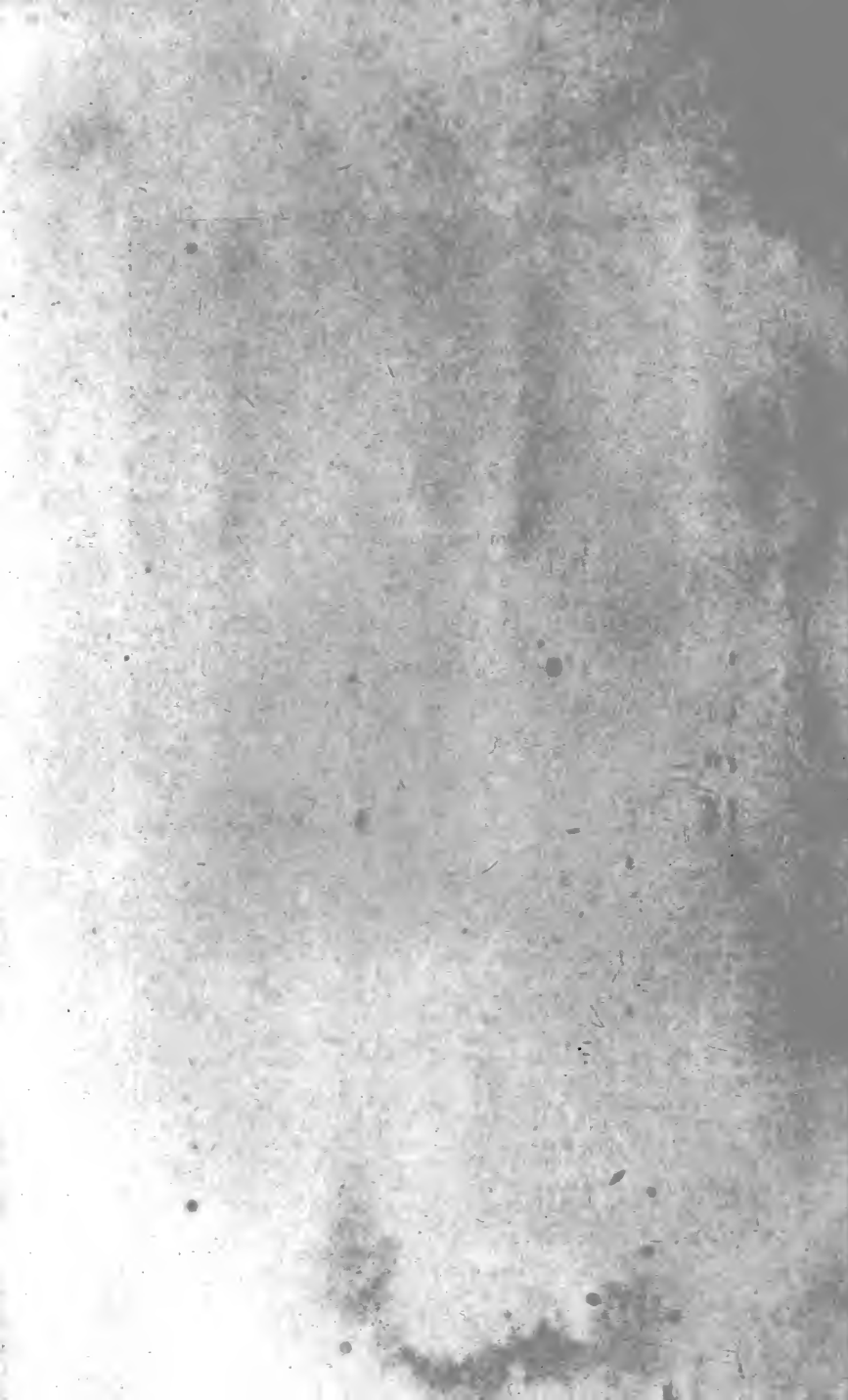
The small arm of Miraflores Lake west of the Pedro Miguel locks, the silting up of which by dredging operations was described in our report for 1920, became, as predicted in that report, a troublesome and most extensive breeding place for *Anopheles albimanus* as vegetation developed in it. In the shallowest water, for some hundreds of yards from the west bank, cattail and other vertical growth occurred. This is not believed to have caused much breeding, although systematic and thorough investigation of it is impossible. But along the east side, in the deeper water (1 to 2 feet) near the lock wall, a species of chara and other floating aquatic plants invaded and almost covered the surface of the water for a space half a mile long and 20 to 200 yards wide; this floating vegetation became dense enough to support the weight of small wading birds, excluded the fish from the surface, impeded the progress of a small boat, and literally teemed with anopheles larvae. After the condition was recognized its control was attempted by means of oil sprayed from a tank mounted in a row boat, but this proved a troublesome, expensive means due to the size of the area and the difficulty of navigating it. Oil had to be rolled in barrels from the supply tank on the east side of the Canal, across the lock gates, to the lake edge and transferred to the heating tank there. The lake was visited by the officials of the Dredging Division and of the Health Department, and after seeing the condition, the Superintendent of the Dredging Division offered his fullest co-operation in eliminating it, by constructing a dike and spillway at the junction of this shallow lake with the main body of Miraflores Lake, and using this small lake as a dumping ground for future operations of the hydraulic dredge in maintaining the Canal Cut from Miraflores Locks to the slide area at Culebra. It is estimated that there are now about 600,000 cubic yards of material in the Canal to be removed by maintenance operations during the coming spring months, which will go far toward eliminating much of this lake, and operations of future years will convert it all into dry land except for channels through which must flow the run-off of the approximately 3 square miles of water shed draining into this basin. (See cut No. 1).

With this area corrected it will be logical to extend drainage operations into the adjoining farther areas which until now have had relatively less importance. Cattle pastures on the west side of the Canal will be moved back to the standard 1 mile limit from the towns and their streams trained and boggy places drained.

The chara previously mentioned has also proven troublesome in other lake areas than Miraflores Lake, especially in the shallower parts of reservoirs furnishing Isthmian water supplies. In these reservoirs the Municipal Engineering Division objects to the use of oil or any other larvacide, and that division is attempting to remove the growth from the water by gangs of men dragging it out with boats—a slow, costly, but efficacious means, except that the work must be done almost continuously. The plant grows especially fast



Cut No. 1.—Oiling *Chara foliorosa* with heated oil sprayed from barrel pump mounted on boat in Miraflores Lake near Pedro Miguel. The heated oil makes a fine misty spray which films well, even among the vegetation, when it falls upon the water. (See page 16.)



in the dry season, when the water is clearer, shallower, and there is more sunshine. Its presence on the Isthmus has been recognized only for the past 4 or 5 years, and it has proven troublesome only in the past 2 years. If it existed here previous to that time it was to such a small extent as to attract no attention, and such is its rate of growth since it has been under observation that it is very probably a recent arrival, perhaps brought in by water fowl. Hardly a single body of shallow, clear, still water is free from it now. It seems to grow best in water from 1 to 5 or 6 feet deep, taking root at the bottom and sending up its long tendrils until they just reach the surface of the water, where they form a close wet mat interspersed with algae, in which anopheles delight to breed and fish can not penetrate.

It is fully apparent that with the presence on the Zone of a large new population, most of whom, if not already infected with malaria, surely will be, it becomes necessary to protect our residential and industrial centers more completely than ever from the presence of anopheline mosquitoes. While small breeding places at a distance of a mile or more from a protected center may be disregarded with comparative safety, repeated observations on the Isthmus have demonstrated fully that from large breeding areas, such as swamps and cattle tracked bogs, we may experience large invasions of mosquitoes of all classes, including *Anopheles albimanus* and *Anopheles tarsimaculata*, over a distance of 2 miles or more, and that even a stretch of open water a mile in width does not oppose an effective barrier. (See Report of Health Department, 1919, with map.)

The presence of the settlers has also affected the malaria rate among those whose work requires them to be exposed at night in unsanitated areas, such as the employees of the Dredging Division, those on floating equipment, railroad trackmen, watchmen, lock operators, etc. These men have always had to accept such risk as a part of their jobs, but previously both the workmen and the mosquitoes of the open country were practically uninfected and no great amount of malaria resulted from such exposure. With the new conditions, however, the danger has increased manifold in such areas, especially along Gaillard Cut where most of such work is done.

An increased incidence of malaria among employees and their families occurred also at Silver City, the new negro suburb of Cristobal on the Atlantic side, during the beginning of the past wet season. Silver City was built in 1917-1919, and at that time was thoroughly screened with 18-mesh copper wire. At the time of the visit of the Special Panama Canal Commission, appointed by the Secretary of War to investigate and make recommendations as to the operations of The Panama Canal, the question of screening of houses was considered by the Commission and they recommended strongly, in view of the extensive anti-mosquito work now done and its apparent efficacy, that the Canal cease repairing screens on its quarters and remove all screening as it fell into disrepair. While the recommendation was not concurred in by the Secretary of War and the Governor, it was, however, decided to give it a trial at a favorable point. Silver City was selected, as it lies in an area kept practically free from anopheles production for at least a mile on all sides, although it is within the 2-mile flight range of mosquitoes breeding in the large

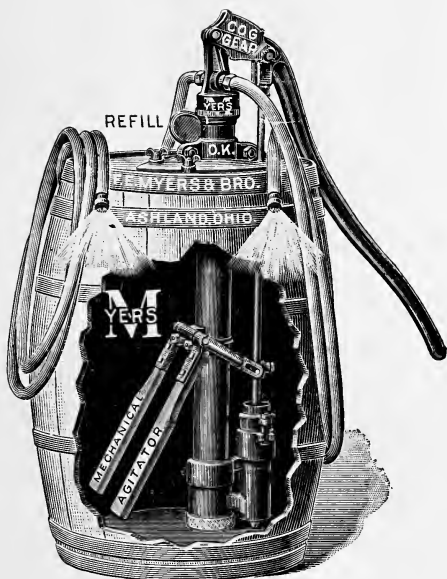
swamps east of Manzanillo Bay and Margarita Road, and the boggy dairy and cattle pastures to the south. Exposed to the salt air, the high trade winds of the recent dry season, and a vigorous onslaught from young West Indians, the screens of Silver City were abandoned to their fate and soon reached a state of disrepair sufficient to make possible a thorough demonstration of the impracticability of the Commission's recommendation. Shortly after the advent of the rainy season, the influx of mosquitoes into Cristobal and Colon from distant areas began. As in previous years at this season, on the screens of Colon Hospital each morning were mosquitoes of many kinds, though not nearly in such numbers as in former years before any ditching was done in the distant Margarita Road swamp areas. Malaria shortly appeared in Silver City, until the number of cases were more than five and one-half times its usual incidence there. After this brief but illuminating experience the Health Department made urgent representation to the Constructing Quartermaster's Division and Silver City was rescreened, with an immediate response in the malaria rate. Screening, though expensive, is still a vital element of defense against malaria in the Canal Zone. Even in Ancon and Balboa, which are least exposed to anopheles flights, a dangerous condition would probably result if without screens during certain seasons of rainfall, from anopheles bred more than a mile away.

Another factor believed to help increase the malaria incidence among colored employees (in whom practically the greater part of the increase occurred) is that in recent years, in addition to opening unsettled parts of the Zone to resettlement for agriculturists, many employees have been allowed to develop garden plots on vacant land in sanitated areas. In these gardens they work until far into the early evening hours, at the very time anopheline mosquitoes, if present, are most active.

The Republic of Panama is continuing the building of good roads into the interior and these afford delightful drives for the many automobiles now on the Zone. It is difficult to trace with certainty malaria having its origin in these drives into unsanitated areas, but it is easy to believe that many cases do so originate.

Every case of malaria treated by a Panama Canal physician is reported to the Chief Health Officer and is carefully analyzed in an effort to trace the source of infection. The place of work, residence, and recreation of the patient is noted and the presence of mosquitoes in any of them is determined if possible. Unless the infection is clearly traceable elsewhere, the case is charged to the district in which he resides; but in many cases so charged it is evident that there is an element of doubt, justifying a strong suspicion that the infection was contracted elsewhere. Picnics and exploring excursions into unsanitated areas in the Zone and the Republic of Panama, beach bathing parties in the evening, automobile rides, road house visits—these frequently at a date not too remote for the infection to have been so contracted, but easily forgotten by the patient unless very skillfully questioned by the physician—doubtless add many cases to those charged against sanitated areas of the Zone.

There is no disposition to charge cases according to preconceived opinions or to make a showing in the statistical tables at the expense of accuracy. The main purpose of compiling such statistics is to



Cut No. 2.—Barrel pump used for spraying heated oil from boat. The “mechanical agitator” is not required for oil. (See also cut No. 1.)



arrive as definitely as possible at a knowledge of the necessity for and the results of our efforts at sanitation, and the foregoing explanations of various increases in malaria rates are offered only as a result of careful study and with an accurate knowledge of underlying conditions in the field. The sanitary inspectors are all capable men of long experience, and their work is under systematic, routine observation by supervising officials, making any sort of gross negligence or unapproved practice impossible.

The preliminary heating of oil to facilitate its passage through the piping and nozzles of spray pumps, without the use of "larvacide" or other diluting substance, has thoroughly demonstrated its practicability and economy. A particularly efficient type of pump has contributed much to its success. The one used is strongly constructed of cast iron, with brass plunger and valves. A geared handle and an ample air chamber in the stand permit of easy operation and a continuous fine spray of oil. (See cuts No. 1 and 2). The drag or mop, made of strands of rope, used in cleaning and oiling open earth and concrete ditches has also, after extended use, proven efficacious and saves greatly in time, labor, oil, and cost. Earthen ditches so oiled require less frequent cleaning of vegetation from the sides and bottom. In fact, a certain amount of growth seems to add to its effectiveness as the oil is retained on the stalks and leaves, to be given off as an effective film for some days following its application. (See cuts No. 3 and 4). These methods were more fully described in last year's report. A further economy in the Pedro Miguel Lake region will result from having placed the sanitary division oil tanks at points convenient to the lake's margins and connecting them to the oil supply line, so as to obviate the necessity for distributing oil by means of barrels and tank wagons. (See cut No. 5).

Anti-plague work.—The work of making the Canal Zone proof against the introduction and spread of plague was energetically continued during the past year. Fumigation and other quarantine precautions are described elsewhere in this and previous reports. While the efficient rat-guarding of lines from ships is specifically a function of the quarantine division, the sanitary inspectors, the police guards at docks, and other employees take an active interest in this feature of preventing the invasion of rats from ships and it is believed that it is being done efficiently and practically. A systematic inspection of residences and industrial plants of the terminal cities is maintained to prevent or detect rat harbors and nesting places. Fortified by a circular of the Acting Governor, pointing out the cause and means of the spread of plague, the importance of protecting the Canal Zone from it, and directing cooperation with the Health Department in its efforts against it, much is being accomplished to reduce the possibility of the entrance or spread of the disease. Rat-proofing of new buildings is insisted on; proper storage of materials is obtained; sealed-in spaces in buildings, especially around plumbing, or elsewhere if the presence of rats is demonstrated, are being eliminated; old buildings undergoing extensive repairs are rat proofed, and in some cases old buildings are torn down.

The older shops and buildings of Cristobal are especially bad as rat harbors and here is needed the greatest amount of work. The extensive docks at Cristobal are built on a mole and fill faced with rubble stone, not cemented together, and many rats live in the

interstices of these stones. The spaces under the docks themselves have been protected recently by means of concrete wing walls cutting off any rats living under them from having access to the shore without swimming considerable distance; but the mole and the water front elsewhere can not be made rat proof in any such manner at a reasonable expense. The entomologist of the Board of Health Laboratory found no fleas on 42 rats caught on the Cristobal docks and sent to him for examination some years ago.

At the same time the rats of Panama City were found to have a comparatively high rate of flea infestation. One small brown rat carried 54 fleas, a roof rat 41, and on three half-grown black rats 103 fleas were found. All these were *Xenopsylla cheopis* Rothschild. While rat-proof construction has been insisted on for many years in Panama, there still exists the large problem of teaching the merchants of the city the proper method of storing merchandise and materials. Panama has a large number of foreigners, Chinese, East Indians, etc., engaged in business, and these are slow to comprehend as well as to carry out orders of the health officer. An effort is being made to teach them the economic importance of rat prevention as well as its sanitary significance.

In the large shop and storehouse areas of Balboa the hearty cooperation of responsible officials has produced a condition that approaches the ideal as regards rat-harboring places, a marked reduction in the rat population being apparent therein. Of course the Isthmus—or even the terminal cities—will never be entirely freed from rodents by our efforts, for the fields and partly cleared jungle of Panama abound with rats of sylvan species and these frequently are caught in the environs of the buildings. Systematic trapping of rats for the purpose of post mortem examination is done in the terminal ports. Rat poison (*barium carbonate*) is used at intervals of not more than one month.

Fly prevention.—While the Zone and the terminal Panamanian cities have at all times remarkably few flies as compared with other tropical communities and with the States in the summer season, we do have seasonal or incidental invasions of numbers of them sufficient to attract attention of the sanitary forces and cause redoubled efforts to eliminate them. During the dry season, storm water street catch basins and also house drains sometimes breed flies in abundance unless they are carefully cleaned or flushed. Careless gardeners may conceal a reserve stock of manure, requiring careful search to discover. In the effort to encourage food production, the use of manure in gardens is not prohibited, but it is occasionally necessary temporarily to withhold permission to use it, or even to impose a small fine upon offenders to teach them to use manure with a minimum of fly production. Fly control is such that an unusual prevalence of flies is followed by a search that is usually rewarded by a discovery of their source.

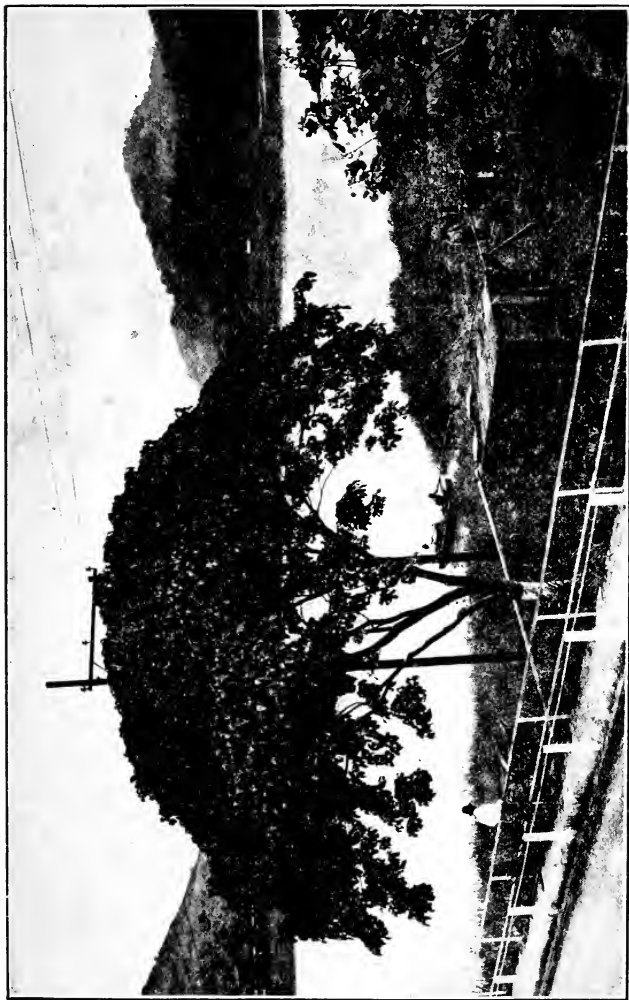
Typhoid fever.—Twenty-nine cases of typhoid fever were reported as having been treated in the Canal Zone and Panama and Colon in 1922. Of these, 6 occurred in Panama, 7 in Colon, 5 in the Zone, and 11 were nonresidents whose infection was contracted elsewhere. All of the 18 cases of typhoid contracted locally were from the colored population, and 4 of these were laborers employed by The Panama



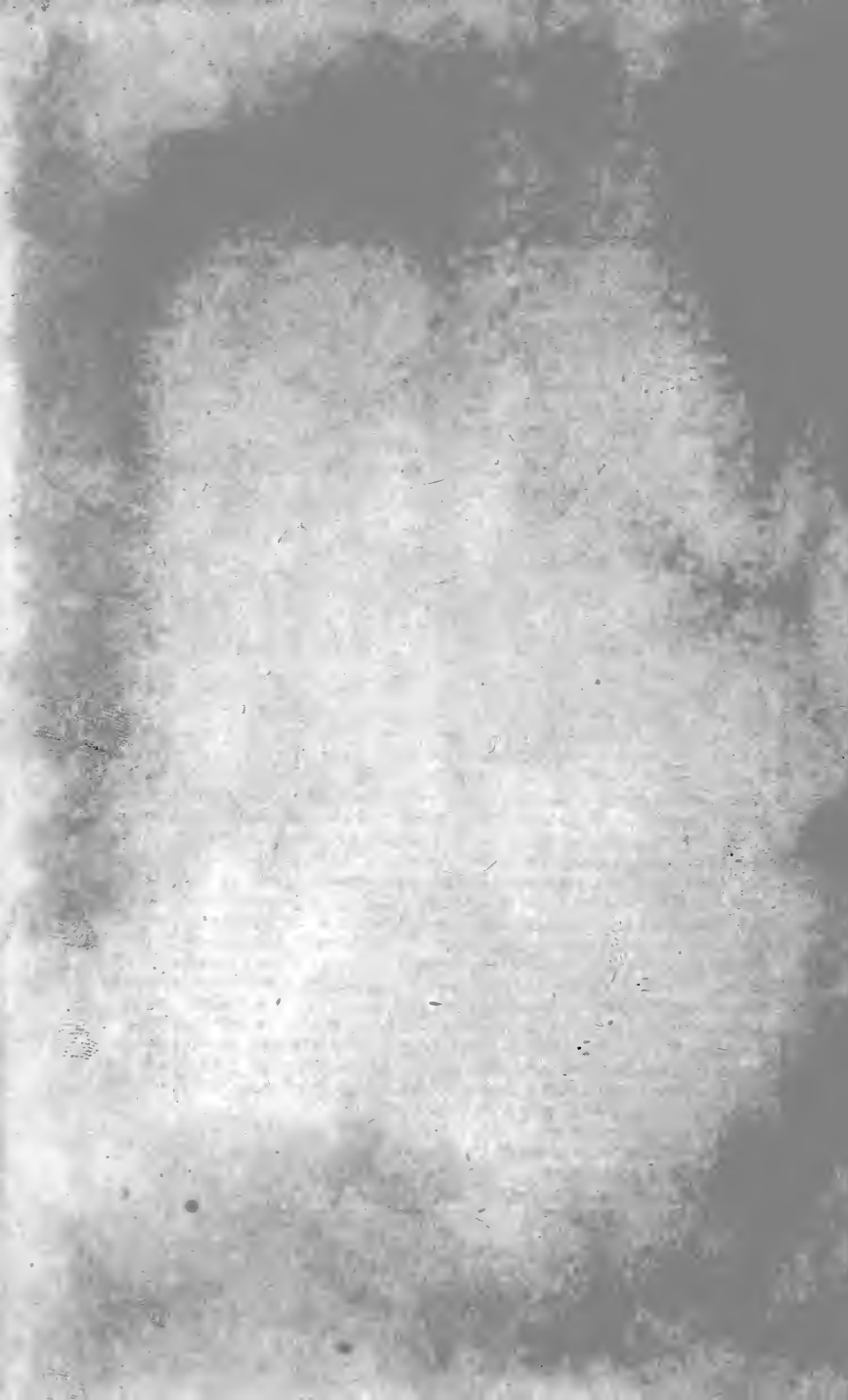
Cut No. 3.—Double-ended oiling mop, made from strands of old rope. In oiling a narrow ditch the mop is dragged with one end following the other. In wider ditches the ends lie side by side. In streams the mop is dragged up one side and down the other. It is very efficacious and is economical of oil and labor.



Cut No. 4.—Oil-soaked mop, made from strands of old rope, dragged through open ditches, earthen or concrete, sweeps out small debris and algae, dislodges mosquito larvae, and leaves a good film of oil on the water. (See page 19.)



Cut No. 5.—Large oil supply tank connected to main supply line, thence to smaller heating tank, this in turn piped to lake edge for transferring directly to pump tank in boat. The heated oil flows freely through the piping and nozzles of the pump. (See page 19.)



Canal; the rest were nonemployees. Six cases terminated in death—5 from the local population and 1 nonresident, all colored, and none of them employees.

Every local case of typhoid fever was carefully investigated as to the origin of the infection. In no case was the source found in milk or water supplies or in faulty sewage disposal, and it is believed that carriers are responsible for practically all the typhoid fever contracted here.

Three new carriers were discovered and placed under sanitary surveillance (see report of Board of Health Laboratory following). The ratio of deaths to number of cases is high here, because of the ignorant class in which the disease chiefly occurs. Many cases do not report to a physician until seriously sick, even moribund, but remain at home depending upon "bush teas" and other remedies of their own until the case is hopeless.

Infant mortality.—The infant mortality rate per 1,000 live births of the cities of Colon and Panama, and of the Canal Zone, for the past 4 years, has been as follows:

	1919.	1920.	1921.	1922.
Colon.....	155.29	142.21	139.28	139.66
Panama.....	154.47	155.30	173.95	147.23
Canal Zone, white.....	37.23	34.36	33.22	41.32
Canal Zone, colored.....	154.00	130.00	134.73	120.27
Canal Zone, total population.....	113.67	95.09	96.65	92.62

These rates do not show the progressive rate of diminution that is desired. Economic conditions, with mounting cost of living and reduction in Panama Canal forces, have been very bad among the poorer classes for the past several years, and we may perhaps be thankful that the rates do not greatly increase. Poverty and ignorance, the latter even among those who have not felt the pinch of non-employment, are blamed for the rates. Milk is scarce and expensive; ice is high and many have no facilities for keeping it; quarters in the Panamanian cities are costly, cramped, and ill lighted. Depending upon midwives and other ignorant persons for medical treatment, and dreading the cost and separation incident to hospital treatment, the lower classes frequently do not call upon a competent physician until it is too late—and often not at all until death has occurred and a burial permit must be secured after filing a physician's certificate of death. The Health Officers of the two Panamanian cities are constantly attempting to better this condition and have employed public health nurses to the extent of their means, but not nearly to the extent demanded by conditions. A great majority of the deaths of infants from various diseases—respiratory, digestive, mastoid, and others—have, as their underlying cause, malnutrition or dietetic error which the physician alone is powerless to correct.

Physical examination of white school children of the Canal Zone.—This examination was made in November-December, 1922, and the results were as follows:

Number of physical examinations made.....	1,451
Number found needing treatment.....	765
Number with defects other than those of teeth only.....	368

Number with defects of teeth as only defect.....	397
Defects found:	
Defective vision.....	202
Defective hearing.....	16
Defective nasal breathing.....	39
Hypertrophied tonsils.....	148
Pulmonary diseases.....	5
Cardiac diseases.....	21
Chorea or other nervous disorders.....	3
Orthopedic defects.....	28
Malnutrition.....	4
Defective teeth.....	479
Contagious diseases (skin).....	4
Total defects.....	949
Number of cases reported treated, defective teeth.....	17
Number of cases reported treated, defects other than those of teeth.....	63
Number of vaccinations performed.....	124
Number of "takes".....	67

HEALTH OFFICE, CITY OF PANAMA.
Dr. HENRY GOLDTHWAITE, Health Officer.

Malaria.—The following is a table of the malaria cases reported as contracted in this city during the years 1916 to 1922, inclusive:

Year.	Number of cases.	Rate per thousand.
1916.....	235	3.87
1917.....	187	3.06
1918.....	97	1.58
1919.....	181	2.95
1920.....	100	1.65
1921.....	67	1.11
1922.....	108	1.79

Few of the residences in Panama are screened against mosquitoes, except in the outlying suburb of Bella Vista, and even here the screening is usually not effectively done. The main part of the city, situated on a rocky peninsula and bordered on the land side by well sanitated areas, is so well protected from *anopheles* invasion that the cost of screening would not be justified. It is believed that the greater part of the malaria reported from Panama City is due to the fact that its citizens frequently visit the unsanitated country, many of them having country residences which they occupy for several months in the dry season. At least a part of the increase in malaria reported in 1922 is due to the fact that an especial effort was made during the year to get every case treated included in the record. This effort was most effective as to cases treated in the hospitals, but it is still possible, and probable, that many cases treated by private physicians are not reported to us.

Oil used in antimosquito work for the past several years has been as follows:

	Gallons.
1917.....	44,896
1918.....	15,701
1919.....	17,828
1920.....	9,365
1921.....	7,170
1922.....	4,496

With the gradual filling in of swampy areas in which the garbage of Ancon, Balboa, and Panama is being buried, the amount of oil used will be further reduced.

Infant mortality.—The following shows the annual death rate of infants under 1 years of age for the year 1914 to 1922:

	Rate per thousand.
1914.....	272
1915.....	221
1916.....	236
1917.....	238
1918.....	188
1919.....	154
1920.....	155
1921.....	174
1922.....	147

The rate for 1922 is the lowest on record for the city, and shows the result of the work of the infant welfare nurses working under the direction of this office, and the free clinic at Santo Tomas Hospital. During the year (one nurse worked but 9 months, the other the full year) the visiting nurses made 7,606 house visits, and 1,952 women and 1,136 babies were sent to the prenatal and baby clinic of Santo Tomas Hospital for treatment.

Veterinary work.—Fees collected for the services of the veterinarian attached to this office amounted to \$1,074.38, as compared to \$1,387.13 for the previous year. This sum is collected for the inspection of cattle and swine and disinfection of hides and skins. In addition to this The Panama Canal received \$225 per month for 9 months of the year from the city of Panama for the inspection of 13,054 cattle and 11,604 hogs which were slaughtered at the municipal abattoir under the supervision of our veterinarian. Nine head of cattle were condemned for the following causes:

Pneumonia.....	2
In a dying condition.....	3
Tuberculosis.....	1
Anthrax.....	1
Septicemia.....	1
Extensive bruises.....	1

There were 645 hogs condemned for the following causes:

Cholera.....	53
Pneumonia.....	6
Pyemia.....	11
Jaundice.....	6
Tuberculosis.....	1
Measles.....	514
Heat prostration.....	41
Septicemia.....	12
Fever, undetermined.....	1

Tuberculosis.—The deaths from tuberculosis for the years 1914 to 1922, were as follows:

Year.	Number.	Rate per thousand.
1914.....	229	3.82
1915.....	245	4.06
1916.....	313	5.15
1917.....	319	5.22
1918.....	254	4.14
1919.....	241	3.93
1920.....	206	3.40
1921.....	222	3.67
1922.....	226	3.76

Diphtheria.—In July, 1922, it was noted that diphtheria seemed to be increasing. Endeavoring to determine its origin, naturally the subject of carriers suggested itself, and in August this office commenced taking throat cultures of all school children within the city and its suburbs; to December 31, 1922, 9,927 cultures had been taken, 223 of which contained bacteria with morphology of B diphtheria; of these, 129 were tested by animal inoculation, 34 proving to be of the virulent type. All virulent type carriers were sent to Santo Tomas Hospital where they were given appropriate treatment, and the Superintendent of that hospital states that "Except where specifically contra-indicated, a routine tonsillectomy has been performed on all of these cases on day of admission, which, with very few exceptions, has produced highly satisfactory results in promptly clearing up the throats of the infected children."

Fines.—There were 999 fines imposed for violation of the sanitary rules and regulations during the year, and \$1,905.75 collected as a result thereof.

HEALTH OFFICE, COLON-CRISTOBAL.

Dr. J. L. BYRD, Health Officer.

The general health conditions were good and no epidemics occurred during the year.

Malaria.—The following table shows the number of malaria cases charged to Colon and Cristobal from 1916 to 1922, inclusive:

1916.....	162	1920.....	98
1917.....	105	1921.....	44
1918.....	41	1922.....	107
1919.....	281		

The increase in number of cases this year is believed to be due largely to the recolonization of the Canal Zone infecting such mosquitoes as gain access to the cities, to gardening operations by employees in outlying areas after working hours, and to the fact that the screens of Silver City were allowed to fall into a state of bad repair for a part of the wet season. (See General Remarks, preceding) There were large flights of mosquitoes from the outlying districts into Colon-Cristobal during the year. The number of *anopheles* though less than in previous years, continued over a longer period because of the prolonged wet season. The free clinic has dispensed quinine freely to the gardeners and settlers which has possibly prevented some malaria cases.

Infant mortality.—The infant mortality rates of Colon from 1917 to 1922, inclusive, have been as follows:

1917.....	245.14	1920.....	142.21
1918.....	186.16	1921.....	139.28
1919.....	155.29	1922.....	139.66

In Silver City, the new negro settlement of 3,300 population adjoining Cristobal, there were but 6 deaths out of 123 live births in 1922, giving a rate of 48.78 per 1,000 live births, which is a most favorable

showing as compared with the rate of 140 for Colon and 120 for black children of the Canal Zone as a whole. Silver City was built 5 years ago, and the houses are of the approved type, commodious, with good lighting and ventilation, screens, water supply, sewers, and concrete streets. Many of the inhabitants have small garden plots in nearby vacant areas and this settlement may be taken to represent the very best economic conditions under which our West Indian laborers live, as attested by the above figures.

Tuberculosis.—The following table shows the number of deaths from tuberculosis of residents of Colon for the past 9 years:

Year.	Number.	Rate per thousand.
1914.....	86	3.69
1915.....	74	2.52
1916.....	91	3.69
1917.....	113	4.45
1918.....	116	4.45
1919.....	101	3.87
1920.....	109	4.18
1921.....	66	2.30
1922.....	80	2.55

Smallpox.—Only one case of smallpox was reported during the year. There were 3,933 vaccinations performed. An effort is being made to vaccinate all infants at the age of 3 months. Schools are frequently inspected and all unvaccinated and unsuccessfully vaccinated pupils are vaccinated.

Anti-plague measures.—This office is conducting an extensive anti-plague campaign. An effort is being made to build the rat out by the installation of concrete rat-proof walls, the elimination of all double wall space and placing of rat-guards on pipes, lines, etc. Extensive repairs were made on all Cristobal piers in order to make them rat proof. Practically all stored material in storehouses, shops, etc., has been restored in accordance with the approved methods of storing. Many minor repairs are being made on various warehouses, storehouses, docks, and storage sheds in order to eliminate potential rodent harboring areas. The mole near pier No. 6 is evidently heavily infested with rats for we are catching from 10 to 12 large rats there each time we trap that area. We are using barium carbonate freely in this area at present. The shore line around this mole needs a rat-proof sea wall in order to reduce the rodent infestation thereon.

Garbage disposal.—There were 22,109 tons of garbage incinerated during the year at a cost of \$1.005 per ton. A saving of \$350 per month in truck service and labor was made possible by the installation of the railroad siding at the incinerator, permitting the handling of trash and garbage by railroad cars from the wholesale commissary, cold storage plant, shops, and docks. Also, the hauling of rubbish for private parties and companies in Colon was discontinued; this service had been done partly as an accommodation and partly to keep the trucks engaged for the full 8 hours; the receipts for this service did not warrant keeping the extra truck required, after the

railroad siding was completed. The average total truck hours per month during 1922 was 1,625, as compared with 2,189 hours in 1921.

Flies.—Colon-Cristobal continues to remain remarkably free from flies. Larvacide has not been used for antily work in this district for the last 2 months and there are no more flies than we had when using larvacide, showing that cleanliness is sufficient to prevent fly breeding.

Free Clinic.—The following table shows the number of cases treated at the Cristobal Woman's Club free clinic during the year:

Surgical cases.....	7,268	Babies treated.....*	4,225
Medical cases.....	5,503	Vaccinations.....	3,933
Prenatal cases.....	457	Specimens to laboratory.....	690

In addition to this clinic, the Cristobal Woman's Club has maintained a soup kitchen for the indigent, which served 19,504 free meals during the year.

Four physicians and 2 dentists donate part of their time to this clinic, and one colored nurse is paid by the club. The Health Officer acts as director of the clinic and the Republic of Panama contributes \$100 monthly to its support. The white visiting nurse of the Health Office supervises the nursing work of the clinic and the cooperation between the clinic and the Health Office is cordial. The two visiting nurses of the Health Office refer cases to the clinic and this in turn reports many cases of contagious disease to the Health Office.

Anthrax.—This is the first year since the beginning of the importation of cattle from Colombia that we have found no anthrax either ante or post mortem at the Panama Canal abattoir.

QUARANTINE DIVISION.

(Surgeon W. C. RUCKER, U. S. P. H. S., Chief Quarantine Officer.)

During the year, the policy of increasing the economy and efficiency of maritime quarantine procedures, mentioned in the annual report for 1921, has been continued with very satisfactory results. The following table sets forth what has been accomplished in the matter of reducing expenditures:

Year.	Gross cost.	Gross saving from previous year.	Earnings.	Reduction in earnings from previous year.	Net cost.	Net saving from previous year.
1920.....	\$90,257.86	.....	\$39,267.64	.....	\$50,990.22	.....
1921.....	79,958.85	\$10,299.01	36,858.70	\$2,408.94	43,031.70	\$7,958.52
1922.....	64,884.44	15,074.41	28,338.74	8,519.96	36,545.60	6,486.10

It will be noted that the gross expenditures for 1921 were \$10,299.01 less than in 1920 and in 1922 they were \$15,074.41 less than in 1921. This represents a total saving of \$25,373.42 in 2 years, a rate of over \$1,000 per month. There was a corresponding decrease in the net cost of operation, that for 1921 being reduced \$7,958.52 from 1920, and

that for 1922 was \$6,486.10 under that for 1921, a total net saving of \$14,444.62 for the 2 years in question. That these net savings were not brought about by increased earnings is shown by the fact that in 1921, \$2,408.94 less was collected than in 1920, and in 1922 there was \$8,519.96 less collected than in 1921. Thus in the calendar years 1921 and 1922, the patrons of the Canal were saved \$10,928.90. Adding to this the \$14,444.62 saved the taxpayers of the United States, it is seen that there has been a fair distribution of the more than \$25,000 saving effected. This is the more remarkable when it is considered that there has been a steady increase in the work performed by our two quarantine stations. Reference to the following comparative table demonstrates this:

	1920.	1921.	1922.
Vessels inspected and passed ¹	3,767	² 3,837	3,952
Vessels passed on certificate of ships' medical officers.....	0	224	87
Vessels granted radio pratique.....	0	0	³ 53
Vessels detained in quarantine.....	70	18	0
Vessels given provisional pratique.....	77	6	1
Total arriving vessels ⁴	3,914	4,085	4,093
Supplementary inspections of vessels.....	2,392	2,751	2,025
Number of days vessels were held.....	170	41	0
Number of ton-detention days.....	48,172	⁴ 413,421	0
Vessels fumigated:			
For rats.....	78	112	107
For mosquitoes.....	33	5	0
For disease.....	0	1	0
Total vessels fumigated.....	111	118	107
Crew inspected on arrival.....	201,979	213,723	215,463
Passengers inspected on arrival.....	67,969	69,511	67,001
Crew passed on certificate of medical officers.....	58,178	108,685	⁵ 27,537
Passengers passed on certificate of ships' medical officers.....	18,617	5,571	⁶ 18,216
Total persons arriving.....	346,743	397,490	328,217
Supplementary inspections of persons on detained vessels.....	5,846	10,269	0
Persons detained in quarantine station.....	4,276	1,861	22
Days detention for yellow fever.....	8,842	615	3
Days detention for plague.....	293	0	0
Days detention for other diseases.....	402	⁷ 8,318	77
Total days detention in quarantine station.....	9,537	⁷ 8,933	80
Persons detained on board vessels.....	16,736	3,900	7
Days detention for yellow fever.....	11,495	1,358	0
Days detention for plague.....	2,294	0	0
Days detention for other diseases.....	10,110	⁸ 20,832	33
Total days detention on board vessels.....	23,899	⁸ 22,190	33
Persons vaccinated.....	895	1,335	1,295
Persons deported under immigration laws.....	660	737	894

¹ Includes also small vessels entering the port of Panama. ² Includes 12 seaplanes. ³ Includes 12 submarines. ⁴ Includes 332,635 ton-detention days, naval vessels. ⁵ Includes 2,044 crew passed by radio. ⁶ Includes 1,647 passengers passed by radio. ⁷ Includes 1,962 passenger detention days, U. S. Navy. ⁸ Includes 15,000 passenger detention days, U. S. Navy.

In the Chief Health Officer's reports for the years 1920 and 1921, there was set forth a compilation of the saving which accrues directly to ships through the application of the policy of inhibiting their movements as little as possible consistent with the health protection of the Panama Canal and its patrons. The loss was set arbitrarily at 50 cents per ton-detention-day and \$5 per passenger-detention-day. Naturally this figure can not be absolutely accurate and is adopted for purposes of comparison only. On this basis and exclusive of the crew-detention-days and vessel-detention-days of Naval vessels, the table is herewith brought up to date:

Year.	Total tons received.	Total ton-detention days.	Total passenger detention days.	Total loss.	Loss per 1,000 tons received.
1918.....	9,717,452	154,176	38,169	\$267,933.00	\$27.57
1919.....	10,779,529	161,376	18,570	173,538.00	16.10
1920.....	17,793,683	48,172	33,436	191,266.00	10.75
1921.....	20,232,456	80,786	14,161	111,198.00	5.50
1922.....	20,898,873	0	113	565.00	.027

NOTE—In previous reports the total tons received included tonnage entering the ports of Cristobal and Balboa either from the sea or from the Canal. In the revised figures above the total tons received represents the gross tonnage of all ships actually passing through the hands of the Quarantine Division, with the exception of small craft entering the port of Panama City.

The number of vessels handled in 1922 was 3,979, making the average loss per ship 14 cents.

An endeavor has been consistently made to "move the ships," that is, to afford to patrons of The Panama Canal quarantine inspection with the smallest possible loss of time. As a corollary to this policy "a sweet reasonableness" has been followed in the application of quarantine measures; old precedents and procedures have not been slavishly followed and a certain elasticity has been introduced which has operated to the great benefit of shipping. At the same time, there has been an adequate health protection of the Canal Zone and the Republic of Panama, quarantinable disease being successfully excluded with the minimum interference with commerce. Yet there has been no evasion of the moral obligation to prevent in so far as possible the passage of disease to the other ports of the world. This policy has been made more easy by the almost complete world eradication of yellow fever and the fact that typhus fever does not thrive in warm, humid, sealevel climates. The periodic fumigation of ships using plague ports, for the destruction of rodents, and the enforcement of rat guarding and breasting off regulations have served to exclude bubonic plague and have also materially aided in the prevention of the further world spread of the disease. In this connection it may be pointed out that at the present time plague is the most widespread of all of the major pestilences, and nearly all of the ports of western South America from Guayaquil southward are infected with this disease; this presents a very grave danger to the Panama Canal and necessitates constant vigilance on the part of the Quarantine Division, since should this disease gain a foothold in the Canal Zone ports it would react harmfully to the shipping interests of the world and to the property of the Panama Canal and the Republic of Panama.

During the year quarantine was maintained at the request of the President of Panama against Chiriqui Province in which smallpox was very prevalent; this ceased in the latter part of the year and the quarantine was then lifted.

Radio pratique, instituted for merchant vessels in February, 1922, has very greatly facilitated the movement of the vessels and has not in any way endangered the health of the Panama Canal since it is applicable only to vessels which intend to transit without discharging or taking passengers or cargo. Since there are policemen on every lock it is not practicable for persons to leave ships transiting the Canal. The only persons from the Panama Canal who board these vessels are the pilots, who do not come in contact with the personnel of the ship to any great extent, and a few line handlers who are stationed at the forward and after parts of the ship. No quarantinable disease has occurred among this personnel.

Beginning July 1, 1922, the quarantine station at Cristobal-Colon was made a boarding and fumigation station only, and the quarantine station at Balboa was made a boarding and detention station. Under this plan passengers at Colon requiring detention are brought to Balboa in a hospital car and there detained. Similarly, when it is necessary to fumigate large vessels at Balboa, the fumigating gang is brought over from Colon. This has resulted in greater facility of administration and in very considerable saving in overhead without in any way lowering the efficiency of quarantine. Both stations were kept in repair, but the station at Colon is regarded only as an overflow station in the event of being obliged to handle larger groups of people than can be accommodated at Balboa.

Immigration operations have been continued as in previous years. On account of the projected visit of the United States Fleet, special precautions were taken to exclude persons who are apt to spread venereal disease or otherwise exercise a deleterious influence upon the Panama Canal and the persons visiting it. Toward the latter part of the year a considerable number of undesirable persons endeavored to gain admission but were not allowed to land and a considerable number of persons who were liable to become public charges were deported.

ANCON HOSPITAL.

Col. L. T. HESS, U. S. Army, Superintendent.

Patients.—The daily average number of white American male patients was such that they could be cared for in Wards 15 and 16 of Section "D," and Wards 10 and 14, Section "C," with the result that Section "A" remained closed during the entire year, resulting in economy without loss of efficiency.

Surgical clinic.—During the year 1,341 major operations and 4,296 minor operations (including intravenous injections of arsphenamine) were performed, 2,683 cases visited the out-patient department for whom 315 prescriptions were written, and 248 obstetrical cases were delivered.

Medical clinic.—There were 2,314 cases treated in the out-patient department, for whom 1,645 prescriptions were written. Seven

cases of smallpox were admitted during the year, none of whom died; 1,928 adults and 240 children were vaccinated.

Eye and ear clinic.—Seven thousand three hundred and sixty cases visited the out-patient department, for whom 2,660 prescriptions were written; 1,506 refractions were made and 1,134 operations performed.

X-ray clinic.—There were 2,843 cases handled, for whom 3,262 plates, 2,524 films, and 2,098 dental films were used; 77 treatments were given.

Steward's department.—There were 112,574 rations issued to patients and 78,852 to hospital personnel, a total of 191,426 rations, the net cost of which was \$65,862.04. There were 24,625 rations issued to pay boarders, for which \$18,460.97 was received.

Motor transportation.—All ambulances and trucks of the hospital, as well as all motor transportation and bicycles belonging to the Health Department on the Pacific side, are inspected by the chauffeur-foreman of the hospital. Running repairs are made by him and when other repairs are necessary request is made on the Supply Department. Certain of our transportation now requires replacement, most of it being of the lightest and cheapest form of equipment which has served its purpose well, but the older units are approaching a state of wear that renders further repairs uneconomical.

Grounds.—During the year fruit trees of the following varieties, from bud wood furnished by the Department of Agriculture, were set out in permanent locations and at the present time are in good condition: *Avocados*—Trapp, Pollock, Waldin, Simmonds, Dade, Butler, Gottfried, and Nimlioh; *Mangoes*.—Anini, Hayden, Kavaspe, Mulgoba, Paheri, Saigon, and Kala Alphonse. In addition we have plants of the following species furnished by the Department of Agriculture set out in permanent locations: *Lansium domesticum*, *Litchi chinensis*, *Hydnocarpus anthelmintica*, *Hydnocarpus castanea*, *Hydnocarpus wightiana*, *Taraktogenos kurzii*, and *Spathodea campanulata*. We have growing in our nursery, plants as follows, which were furnished by the Department of Agriculture, all being in excellent condition but will not be planted out in permanent locations until the next rainy season: *Quercus polystachya*, *Quercus thomsoni*, *Quercus truncata*, *Eugenia Sp. pittier*, *Castanea diversifolia*, *Lagerstroemia*, *Coyo*, *Lansium domesticum*, *Diospyros ebenaster*, *Litchi chinensis*, *Rhedia madruno*, *Garcinia*, and *Macadamia ternifolia*.

The following fruits were gathered from plants on the hospital reservation, for consumption by patients.

	1922.	1921.	1920.
Bananas (bunches).....	377	502	290
Papayas.....	39	173	285
Bread fruit.....	1,115	1,377	687
Mangoes.....	2,600	2,835	7,841
Avocados.....	214	846	1,089
Guavas.....	1,150	4,100	2,385
Limes.....	5,525	13,237	18,658
Coconut.....	283	249	234
Oranges.....		192	285
Sour sap.....		10	15

DATA REGARDING PATIENTS.
(Ancon and Corozal Hospitals.)

REPORT OF PATIENT DAYS.

1922.....	252,680
1921.....	263,710
1920.....	296,946
1919.....	312,737
1918.....	319,908
1917.....	311,451
1916.....	270,294
1915.....	268,945
1914.....	338,901

MOVEMENT OF PATIENTS, NONRESIDENTS OF CANAL ZONE.

Year.	Total number treated.			Died.			Days treated.		
	Ancon Hospital.	Corozal Hospital.	Total.	Ancon Hospital.	Corozal Hospital.	Total.	Ancon Hospital.	Corozal Hospital.	Total.
1922..	488	66	554	6	2	8	11,709	15,782	27,491
1921..	584	54	638	11	1	12	11,043	13,657	23,700
1920..	1,250	54	1,304	16	1	17	24,418	15,979	40,397
1919..	883	56	939	19	3	22	14,534	17,245	31,779
1918..	510	76	586	9	10	19	7,667	20,431	28,098

MISCELLANEOUS DATA.

	1922.	1921.	1920.	1919.	1918.
Chronic patients:					
Total number treated.....	34	33	33	34	38
Total number days treatment.....	9,065	9,514	9,626	9,710	8,603
Average number of patients per day....	24	26	26	27	26
Per capita cost.....	\$0.373	\$0.324	\$0.315	\$0.265	\$0.260
Movement of military patients:					
Total number of admissions.....	1,331	1,449	860	1,392	4,165
Total number of days treatment.....	28,146	25,146	15,134	22,217	49,067
Average constantly sick.....	77.11	68.89	41.35	60.90	134.49
Total admissions:					
To Ancon Hospital.....	6,243	8,146	9,783	10,503	12,153
To Corozal Hospital.....	187	227	170	151	229
To chronic ward.....	11	7	7	8	13
To cripple farm.....	9	5	12	17	39
Totals.....	6,450	8,385	9,972	10,679	12,434
Deaths:					
In Ancon Hospital.....	220	222	276	343	336
In Corozal Hospital.....	33	26	32	43	73
Operations:					
Major surgical operations.....	1,341	1,603	1,653	1,688	1,784
Minor surgical operations.....	4,296	3,562	5,781	5,813	4,424
Eye and ear operations.....	1,134	1,479	1,215	1,044	1,088
Refractions.....	1,506	1,406	1,052	1,263	1,312
Obstetrical cases delivered.....	248	268	289	314	321
Out-patient department:					
Total visits.....	12,257	13,341	13,123	13,833	14,276
Prescriptions written.....	4,620	5,923	4,708	5,424	2,430
Dispensary (district physician):					
Total treated.....	43,459	90,623	105,171	102,034	92,201

FINANCIAL STATEMENT (ANCON HOSPITAL ONLY).

	1922.	1921.
Operating expenses.....	\$525,585.44	\$577,086.50
Revenue.....	312,713.70	312,132.40
Net cost.....	212,871.74	264,954.10
Gross cost per patient per day.....	4.67	4.62
Net cost per patient per day.....	1.89	2.12
Operating expenses, dispensary.....	16,438.74	18,518.85
Revenue, dispensary.....	1,883.05	572.50

COROZAL HOSPITAL.

(DR. LOUIS WENDER, Superintendent.)

Buildings.—An annex to Ward "I" was constructed in order to have entirely separate accommodations of white female patients. This will take care of 6 patients. The cost was approximately \$2,000.

An extension was added to the carpenter and paint shop containing 360 square feet of floor space for storing broom corn and other supplies for the industrial ward. Ward "F" was enlarged by the addition of 336 square feet of floor space, this being necessary to house the broom-making section of our industrial activities. These were erected by hospital artisans and patients under supervision of our employees.

Painting, repairs to woodwork and to screens, as well as plumbing, have been done wherever required, by hospital artisans, with the help of patients.

Hospital grounds.—The various foreign tropical plants introduced here by Dr. D. F. Fairchild of the United States Department of Agriculture during the latter part of 1921, and which were planted within the hospital enclosure, have taken root firmly in the soil, and show a healthy growth, with the exception of some few which died following transplanting and transfer. The lawns and numerous flower beds have been maintained throughout the year by the patients' gang, who cut grass, trim hedges, clean grounds, sweep roads, etc., without any extra expense to the hospital.

Hospital department.—The census of this hospital on December 31, 1922, was 389, as compared with 401 on the same day of last year. The total number admitted was 183; as compared with 227 for the preceding year. There were 158 discharges and 33 deaths, as compared with 177 discharges and 26 deaths last year. Of the total patients transferred to Ancon Hospital, 4 were not received back at Corozal, still remaining there or having died or been discharged by that institution. Of these discharges, 44 (28 per cent) were recovered, 60 (38 per cent) were improved, and 54 (34 per cent) unimproved. Of the total admissions, 111 were cases paid for by the Government of Panama; the balance were Canal Zone charity or private pay cases. Of those discharged, 90 were deported, 25 to the United States, 3 to Great Britain, 1 to China, and 61 to the West Indies and nearby countries.



Cut No. 6.—Handicraft as a restorer of the insane. Industrial ward, Corozal Hospital.



Great difficulties have been encountered in the past in securing transportation on steamships for patients to the West Indies, except to Jamaica; the result was an ever-increasing number of patients, until we finally had 412. Arrangements were therefore made for the Panama Canal lighthouse tender *Favorite* to take 41 patients and about 50 employees and their families to Barbados and Antigua, in November; this relieved some of the congestion in the wards.

The total of 66 per cent of discharged patients classed as recovered and improved compares very favorably with the best institutions for the insane in the United States.

A great many of our admissions are for mental disorders produced by syphilis and alcoholism, especially the former. All of the syphilitic psychoses, which form about 17 per cent of the total admissions, are given intensive treatment. During the year 654 doses of salvarsan were administered intravenously, and 245 lumbar punctures were performed, in addition to other antiluetic medication. The results obtained in the cases of those patients suffering from cerebral syphilis have been very satisfactory. Considerable attention has been given to the epileptic cases, and quite favorable results have been gained for the use of luminal in reducing the number of epileptic convulsions and modifying the severity of such attacks.

In the occupational ward the men are taught woodwork, toy making, painting, tin work, and making of brooms. The women are instructed in the arts of rug-weaving, both by hand and loom, embroidery, crocheting, basketry, and all sorts of needle work. The total sales from the occupational ward amounted to approximately \$4,000, some of this is utilized for the purchase of material required for maintaining the ward, the balance being turned in for credit to the hospital. A surplus of \$750 was thus turned in during the year. A great deal more could be accomplished in the matter of occupational therapy, by the employment of an industrial expert to devote full time to this work; the chief nurse, who now supervises this work, is unable to devote more than a portion of the day to it, due to the stress of other duties.

Some of the male patients who are stronger physically and who can not be accommodated in the occupational ward on account of limited space, are sent to the field to practice agriculture, while the females are assigned to tasks in the laundry, sewing room, and the salvage department. All of the laundering, with the exception of bed sheets and nurses' uniforms, is done by the patients. As a result of these various undertakings, between 60 per cent and 70 per cent of the patients are engaged in some form of work at all times. In order to encourage these working patients, they are allowed small sums of money with which they are able to purchase in the hospital, tobacco, confections, fruits, and commodities of a like nature. When discharged from the hospital they are given the money they have saved from their earnings. The value of the produce taken in from the patients' garden for hospital consumption amounted to \$4,032.87.

There were no suicides or deaths due to violence among the patients.

Chronics.—We have at present 21 colored and 2 white chronic cases, as compared with 24 and 1, respectively, at the beginning of the year. The 21 colored patients were accommodated in one of the wards. During the year 3 chronic patients died and 4 were repatriated to their homes in the West Indies.

Farm department.—There were 30 cripples on the farm at the close of the year. Three were given a small compensation from the alien cripple fund and repatriated during the year.

Dairy.—The herd consists of 51 Jersey grade cows and 33 calves; 14 Holstein cows and 10 calves, and 2 Holstein bulls. There were 104,548 quarts of milk produced, and milk sales during the year amounted to \$24,495.95. Efforts are being made to remove from the herd all of the cows which are unproductive. Tuberculin tests were carried out showing comparatively low number of reactors, which were promptly removed from the herd. The fat content of the milk continues high. All of the milk is pasteurized, and examinations are made of specimens at the Board of Health Laboratory at frequent intervals. These examinations have shown uniformly low bacterial counts.

Piggery.—There were 351 pigs and 58 hogs remaining at the end of the year. The piggery has proven one of the most profitable divisions of our farming activities, the total income during the past year amounting to \$2,514.07.

COLON HOSPITAL.

(Maj. T. J. LEARY, U. S. Army, Superintendent.)

The work of the hospital has gone along in a very satisfactory manner through the year, in spite of the fact that the small personnel is frequently changing and the routine work must continue while part of the personnel is on vacation.

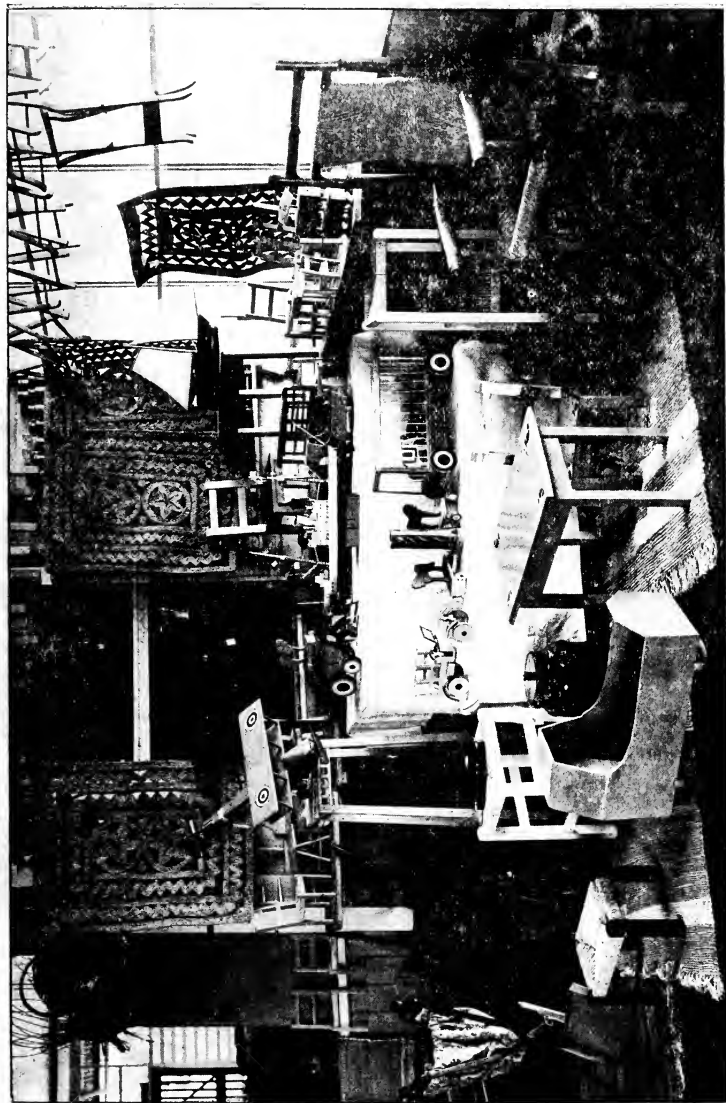
During the past year 2 medical officers of the Army have been added to our staff, making a total of 4 Army medical officers now on duty here.

A personnel of 5 physicians and 2 internes are employed by the hospital, which averages 40 cases daily during the year besides a very busy dispensary serving 5,000 to 6,000 out-patients a month. The dispensary service includes periodic examinations of school children, and many professional calls in old and New Cristobal.

During the year, with our small outside force consisting of 2 general utility men and the services of the ward and operating room attendants when they could be spared, we managed to repaint considerable of the interior of the hospital proper.

Ward "A" of the old hospital buildings is still standing but will not be serviceable much longer as an isolation ward, as it is rapidly going to pieces from age. However, it is seldom used and it may serve its present purpose for another year or so.

It is believed that the expansion of Colon Hospital will eventually be necessary, not only from the standpoint of the needs of those living in Colon-Cristobal but from the standpoint of possible military or naval necessity. This hospital is at all times handicapped by the lack of X-ray and eye, ear, nose, and throat facilities and very many



Cut No. 7.—Work of the patients. Industrial ward, Corozal Hospital.



adverse comments are heard not only from the people living here but from tourists and business people visiting the Isthmus. It is hardly logical that in a city of the size and importance of Colon-Cristobal one must go 50 miles by train across the Isthmus in order to have made a simple X-ray or fluoroscopic examination. There will always be objection on the part of those living on the Atlantic side to the separation from their sick ones, who are transferred to Ancon Hospital, and this objection should be considered as a serious one.

SANTO TOMAS HOSPITAL (Republic of Panama.)

(Maj. EDGAR A. BOCOCK, U. S. Army, Superintendent.)

This hospital is maintained by the Republic of Panama, but is under the supervision of the Chief Health Officer of The Panama Canal, and the Superintendent, 2 physicians, chief nurse, and 2 nurses, are paid by The Panama Canal. That the hospital has advanced during the year 1922 was recognized by His Excellency, Doctor Belisario Porras, President of Panama, when on September 1, 1922, he submitted a message to the National Assembly containing the following:

"Hospital Santo Tomas.—I take pleasure in informing you that the Santo Tomas Hospital has arrived at such a degree of progress and efficiency that it is an honor to us who are constantly seeking the welfare of the country."

To bring about the progress mentioned in the foregoing, very few radical changes in policy or methods have been implanted during the year, but those previously in effect have been intensified, modified, and improved in an attempt to ensure their more efficient functioning. A constant effort has been made, by furnishing careful and courteous treatment to all patients, to improve the confidence of the public in the institution; to encourage and educate the people having little knowledge of hospital methods to present themselves for treatment early during their disease rather than after they have become moribund; and to treat every person coming under the hospital's care in such a manner that upon leaving he becomes a friend and a "booster," rather than an enemy and an injurious critic. All personnel of the institution has been particularly instructed in this regard and by patient, kindly adjustment in the few cases in which misunderstandings and friction have arisen, it has nearly always been possible to smooth out apparent difficulties to such an extent that it is believed the hospital has more friends and a better reputation in the community than at any previous time.

Training school for nurses.—On March 1, Miss Genevieve Russell, who had been Director of the Training School, resigned this position and was replaced on April 1, by Miss Sara E. Adams of Mexico City. The eighth graduating class of nurses, 9 in number, finished their course of study in the training school on January 29, 1922, and all of these young women have secured suitable positions for the practice of their profession. During the year an active effort has been made to improve the standards of the training school, in order that its graduates may be more in demand and better qualified to fulfill the

professional responsibilities that devolve upon a nurse. Rigorous examinations and careful selection of candidates have shown gratifying results in this particular.

Finances.—The year 1922 has been a prosperous one for the hospital. The total appropriations and income for the year amounted to \$236,897.75, while the expenditures for the year were \$222,873.65, leaving a balance of \$14,024.10.

Housekeeping department.—During the year, 192,068 rations were prepared and issued for the personnel and patients of the hospital. The average cost per ration (doctors, nurses, and patients) was \$0.35. The average cost of hospitalization per patient per day, including subsistence and professional care, amounted to \$1.87 per day, as compared with \$1.97 for 1921. During the year a bakery was established and now all bread, pastries, etc., required by the hospital are being prepared therein at a cost practically 50 per cent below the prevailing prices in the local market.

Foreman's department.—The laboratory, isolation section, nurses' quarters, and operating room have been completely repainted during the year, and are now in excellent condition. Minor repairs have been made to practically all buildings, a large amount of whitewashing has been done and various wards painted. All electrical, plumbing, and other repair work has been done by hospital artisans, obviating the employment of high salaried mechanics for this purpose. Owing to the very old and deteriorated condition of the buildings, constant and active attention will be required to maintain them in a habitable state until the new hospital is completed.

Professional service.—During 1922 a continued effort has been made to improve the professional service of the hospital and considerable progress has been noted, although it is still far from being all that is demanded by a present day modern hospital. As during the past, the number of doctors and graduate nurses is very limited for the amount of work that must be performed, and in order to further improve the efficiency and progress of the institution, no more necessary or desirable step could be taken than the authorization of several additional capable resident physicians and graduate nurses. At present, the hospital is largely run with internes and pupil-nurses with only such supervision as can be given by a very limited staff, and so long as this condition prevails it will not be possible for the institution to reach the stage in professional work that is desirable.

There were 9,404 patients admitted during the year; 111,004 days relief was furnished, the average number in the hospital daily being 333. There were 771 deaths, 211 transfers to other hospitals, and 8,122 discharges. The average length of stay in hospital was 8 days. During the year 5,432 cases were treated by the medical service. There were 1,478 major operations and 725 minor operations performed by the surgical service. The hospital laboratory performed 503 autopsies, 6,840 Wassermanns, 12,714 urine analyses, 3,530 blood examinations, 97 chemical analyses and 9,621 miscellaneous examinations.

The hospital pharmacy filled 12,765 prescriptions for dispensary patients, and furnished all drugs and medical supplies to the wards of the hospital as well as all wholesale drugs used by various departments of the National Government of Panama, and other organizations having the privilege of procuring supplies from the institution.

At the dispensary there were 7,820 consultations, 11,027 surgical dressings, and 1,961 vaccinations, in addition to the examination and passing upon all patients seeking admission to the hospital and making physical examinations on numerous cases desiring certificates for lodges, passports, and other purposes. The ambulance service made 1,826 calls.

The X-ray department handled a total of 1,324 cases. In making these examinations 3,478 plates and 532 dental films were used, while 163 X-ray treatments were given. During the year a change was made from the use of glass X-ray plates to that of duplitized films owing to the economy in price and easier transportation.

In the eye, ear, nose, and throat clinic there were 4,796 examinations and treatments; 193 operations, 341 refractions, and 1,272 prescriptions furnished.

The venereal clinic and genito-urinary department have rendered good service, but the examination of prostitutes that is required by existing municipal laws has not been satisfactory on account of failure of the authorities to force these women to report for their weekly examination. The number of new cases admitted to this clinic was 2,721,—1,847 males and 874 females. Consultations to the number of 1,432 were given, and 35,190 treatments were provided; 2,323 injections of salvarsan and 2,792 injections of mercury were given, and 505 surgical operations were performed. Of the Wassermann tests performed, 28.54 per cent were positive.

During the year the Junta Nacional de Higiene authorized the establishment of a venereal clinic in the city of Colon, to be operated under the supervision of this hospital in the same manner as the one conducted within the institution. This clinic was opened July 1, and has been operated in a very satisfactory manner.

The maternity service and the prenatal clinic have been progressive and exceedingly active throughout the year. Expectant mothers to the number of 2,136 have been examined in the clinic and 871 babies have been delivered in the ward. The number of babies born dead, or dying immediately after birth during the year was 62, as compared with 74 for last year. The results attained in the clinic prove conclusively that the infant mortality when mothers avail themselves of the benefit of prenatal care is reduced by at least 30 per cent below that shown when mothers have not had such care.

Every possible effort has been devoted to keeping the hospital in line with the newer professional developments. Several members of the hospital staff were sent as delegates to the Sixth Latin-American Medical Congress held in Habana, Cuba, during the month of November and were greatly benefited by their visit to this conference. Other members have visited the clinics of Europe during the year and have returned to Santo Tomas Hospital much better qualified for their duties and responsibilities to the institution. The Medical Association of the Isthmian Canal Zone met at this hospital three times during the year, and interesting and instructive papers were read by the staff of the institution. A study of 15,000 cases of stovaine anesthesia was presented by the chief of the surgical service while various other contributions of merit have been prepared from time to time.

PALO SECO LEPER COLONY.

(Mr. FRED D. TUCKER, Superintendent.)

(Dr. PHILIP HORWITZ, Attending Physician.)

Statistics regarding patients follow:

	Remaining, Jan. 1, 1922.		Admitted.		Died.		Paroled.		Remaining, Dec. 31, 1922.	
	White.	Black.	White.	Black.	White.	Black.	White.	Black.	White.	Black.
Panama Pay.....	6	40	1	6	.....	3	.....	1	7	42
Zone charity.....	.....	32	.....	4	.....	4	.....	4	.....	28
Totals.....	6	72	1	10	.....	7	.....	5	7	70

¹ Three Chinese and 4 Panamanian.² One was a readmission.

The admissions were classified as follows:

	Male.		Female.	
	White.	Black.	White.	Black.
West Indian.....	.....	3	.....	1
Panamanian.....	1	5	.....	.....
Haitian.....	.....	.....	.....	1
Totals.....	1	8	.....	2

The average age at time of admission was 36 years for males and 26 years for females; two of the males were married and the rest were single. The clinical types of disease were: Nerve, 6 male, 0 female; Tubercular, 2 male, 1 female; mixed, 1 male, 1 female.

The deaths were distributed thus:

	Male.	Female.	Total.
West Indian.....	5	.....	5
Panamanian.....	1	1	2
Total deaths.....	6	1	7
Average age at death..... years..	49	75	52
Average length of time with leprosy..... years..	9	6	8.4
Average length of stay at Palo Seco..... years..	7	6	5.6

The discharges (paroles) were classified as follows:

	Male.	Female.	Total.
West Indian.....	2	1	3
Panamanian.....	2	.....	2
Totals.....	4	1	5
Average age at discharge..... years..	28	46	31
Average length of time with leprosy prior to discharge..... years..	9	27	13
Average length of stay at Palo Seco..... years..	6	1	5
Type of disease:			
Nerve.....	3	1	4
Tubercular.....	1	.....	1

A monthly average of 25 patients was given employment, their monthly payroll averaging \$195.45, or \$7.82 per patient employed. Local products were purchased from patients to the amount of \$464.97; cash allotments which vary according to the degree of disability of the patient, totaled \$1,452.50. Total cash sales at the local store amounted to \$2,655.27.

During the year, 20 pigs from the colony farm were killed for food and at present there are 14 pigs on the farm.

A steam operated laundry with electrically driven washing machine was installed during the year, and is operating very satisfactorily. It has enabled us to dispense with the services of one laundress, to save half on the soap bill, to disinfect patients' clothing by boiling, and to do the work more quickly and easily, and better.

The amount of local produce raised by patients was smaller than last year. This was due to two reasons, both connected with the hypodermic administration of chaulmoogric acid esters. In the first place, nearly everybody was disabled for a day or two weekly, and some for longer periods, and in the second place many were so hopeful of release that they could not be persuaded to start farming operations. The parole of 5 inmates during the year and the improvements noted in the physical condition of others encouraged many unduly in spite of the careful explanations given them.

The buildings of the colony are all wooden structures, some of them being 15 years old, and their repair and upkeep increasingly demand more labor and material. The water supply, owing to a leak in the bore of the artesian well, is a problem each dry season.

Weekly motion picture exhibitions were continued and greatly enjoyed. Two bands, the Silver City and the West Indian, gave concerts at Palo Seco during the year. As they are the only such organizations to donate their talent and time to our colony's pleasure, for which they receive no remuneration, their kindness is worthy of deep appreciation.

The attending physician of the Leper Colony makes the following report:

Admissions.—Eleven cases were admitted to the colony during the year. Of these, 8 were new patients, and three were readmissions. Of the latter, two had escaped in 1919, and one had been paroled during the current year. The last was readmitted at his own request, because of his crippled condition from trophic ulcers.

Births.—Two children, both legitimate, were born to leprous inmates. Both children were removed from contact with the mother at birth. One child, male (both of whose parents have the active type of the disease) died of malnutrition 4 weeks after birth. The other child, female (whose parents are of the arrested type) is still living, outside the colony, and is apparently free of the disease.

Deaths.—There were 7 deaths among patients during the year.

Treatment.—Three days per week were allotted to specific medication. On one day intramuscular injection of the ethyl esters of chaulmoogric acid was given to practically every inmate, the exceptions being those who by reason of extreme age or other serious complications could not stand such treatment. On the other two treatment days, the intravenous method was used on about 25 per cent of the cases, in addition to their intramuscular injections. Few

were given intravenous injections only. Both methods were found to possess distinct merits; the intramuscular offers slow absorption of small quantities over extended periods, and therefore subjects the patients to the continuous effect of the drug; the intravenous causes rapid absorption, and throws large doses in contact with diseased areas, but, owing to its rapid elimination, has to be repeated frequently to be of value. The combined method has proven most effective.

Five c. c. per dose for both intramuscular and intravenous routes for adults and even for children of 10 years was found practical. In adults the initial dose was also 5 c. c. but the young or weak were started on smaller doses that were gradually increased. The use of larger doses was tried on a few selected inmates. In these cases the dosage was increased until each patient was receiving 48 c. c. weekly (20 c. c. in one intramuscular injection, and 14 c. c. in each of the two weekly intravenous treatments). These large doses could be tolerated for short periods only, and this method was later abandoned.

In July 300 c. c. of special esters prepared in the laboratories of the University of Hawaii were forwarded to the colony for trial and comparison with the local product. Shortly thereafter a newly admitted patient of mixed type and of recent infection was put on the above preparation receiving 5 c. c. by intravenous injection once weekly.

In June, the British Consul sent us samples of a proprietary preparation of colloidal antimony under the name of "Oscol-Stibium" with literature reporting excellent results of its use in British South Africa. The results described were especially good in nerve-type cases with trophic ulcers. Altogether about 2,000 c. c. were used in 8 selected cases here, using the intravenous method 3 times weekly. Patients receiving this drug praise it very highly.

The 3 days of each week on which treatments were not administered, were devoted to maintenance of records, photographing lesions, non-specific treatments in clinic, treatments of complications, local treatment of ulcers, and bacteriologic examinations of discharges and skin for organisms. The specific medication and local applications to lesions at times render negative smears from nasal mucous membranes; therefore, to prove the permanency of the disappearance of the germ, the provocative administration of potassium iodide in ascending doses was resorted to. Owing to the extreme hypersusceptibility of leprosy patients to this drug which causes dormant lesions to light up and renders nasal discharges positive, it has also been used in testing possible candidates for parole. In such cases ascending doses up to a maximum of 24 grams daily were administered.

Results.—On the whole, we conclude that the treatment with esters is undoubtedly capable of arresting the progress of the disease and of ameliorating its course. This is especially true of the combined method of intravenous and intramuscular treatments.

Some patients, stimulated by the paroles of their comrades, were quite willing to undergo the hardships and inconveniences of treatment in the hope of regaining their freedom. This, however, was not true of all cases, as others were reluctant to leave the asylum, and

unfortunately most of the latter were of the arrested type who could easily be passed by the Leprosy Diagnosis Board as noninfectious, and might be paroled except for the fact that they are so crippled and maimed that they are probably better off in the colony than outside.

The seriously discouraging feature was the inability after 16 months of continuous treatment to render free from infectious organisms, patients in whom these had been demonstrated in discharges and skin prior to specific treatment. Large doses of esters had no effect other than that obtained by doses of 5 c. c. The Hawaiian esters showed no better results than those made at our Board of Health Laboratory. Oseol-Stibium was of doubtful value, even in nerve-type cases with ulcerations, although the latter yielded fairly well to local treatment but could not be cleared up entirely. Neither did the treatment prevent relapses and recurrences of relapses in the same individual at varying intervals, though the severity of the attacks was probably milder and the duration shorter than in the untreated. Curiously enough, relapses occurred at changes of season. The last outbreak was in December (the last month of the rainy season), when about a dozen patients had attacks of lepra fever, and eruptions, which, with varying degrees of severity, subsided within the month.

Paroles.—Five cases were paroled during the year. All exhibited tolerance to potassium iodide in the maximum doses, with the exception of one case which had thyroid enlargement, and this patient tolerated 6 grams daily—an enormous dose for an active case. Incidentally, this patient returned to the colony, at his own request, being readmitted as clinical type only.

The absence of organisms in the paroled patients can not be definitely attributed to the effect of treatment, inasmuch as they all had been found negative before specific treatment was instituted, with the exception of one case who on admission had shown positive films from crushed nasal mucous membrane only and has failed to show the organisms subsequently in smears from the wound of excision, or in similar tissue removed during a local operation on the nose. The above patient, having been admitted after treatment with esters was begun, and therefore having received no other form of medication, may have been benefited by specific treatment. Of the others, some of whom had been taking the crude chaulmoogra oil by mouth, and some not at all, or in small quantities at irregular intervals, it is doubtful whether the disease was arrested by treatment. And in view of the fact that leprosy does become spontaneously arrested in a small number of cases it is more plausible to assume that they belong to this class. Under the circumstances it still remains to be seen whether the continuous and persistent application of this special form of treatment will eventually eradicate the cause of this dreadful disease and accomplish definite and permanent results.

BOARD OF HEALTH LABORATORY.

(Dr. L. B. BATES, Chief of Laboratory.)

(Operated in connection with Ancon Hospital.)

The routine work of the laboratory during the calendar year 1922, has been uniformly heavy, but special work such as usually results from epidemics and newly imported diseases has been light.

At various times throughout the year blood films showing malarial parasites, smears, cultures, intestinal parasites and ova and other laboratory specimens have been forwarded to medical schools requesting them. The demand for this material is constantly increasing.

Relapsing fever.—The work with the local relapsing fever spirochete, which was begun in 1921, was continued in 1922. In 1921, the human tick, *Ornithodoros talaje*, was proved to be a transmitting agent of the relapsing fever in Panama, but the data at that time was insufficient to determine the identity of the spirochete under study. In 1922, comparative studies were made of *S. obermeieri*, *S. novyi*, *S. kochi*, *S. duttoni*, and the spirochete of Panama, by inoculating white rats and white mice which had recovered from each of these infections with the spirochete of Panama; and by ascertaining the effect of immune serum of each of these spirochetes upon each spirochete, both by dark field examination and by animal inoculation. As a result of this work it was demonstrated that the spirochete of Panama differed from all of the above-named strains, which strains were kindly furnished this laboratory by Prof. F. G. Novy of Ann Arbor, Mich. This work was described in full in the May, 1922, number of *The American Journal of Tropical Medicine*. *Spirochæta neotropicalis* was offered as a specific name for the spirochete causing relapsing fever in Panama in the August 12, 1922 number of *The Journal of the American Medical Association*. (Vol. 79, pp. 575-576.)

Bacillus typhosus.—Recovered in blood culture from 17 individuals; 6 of these patients were from shipboard and 11 from the Canal Zone or Republic of Panama. *B. paratyphosus B* was recovered once in blood culture from an 18-months old colored female child. In addition *B. typhosus* was recovered from the stools of two colored children who also had the signs and symptoms of typhoid fever.

Typhoid carriers.—On December 31, 1921, two *B. typhosus* carriers, (stool) were under sanitary surveillance, H. B., a colored laborer, and G. H., a Chinaman. Three additional carriers were detected during the year, J. S., a colored laborer, C. de L., a woman residing in Colon, and F. A., a colored woman patient in Corozal Hospital. A cholecystectomy was performed upon F. A., on March 7, 1922, and all subsequent cultures have been negative. J. S., had typhoid fever in Colon Hospital in November, 1921. C. de L. gives no history of having had typhoid fever, but one member of her household had typhoid fever in November, 1922. There were 4 typhoid carriers under sanitary surveillance on December 31, 1922; H. B. and G. H., of Panama City, and J. S., and C. de L., of Colon.

Diphtheria survey in Panama City.—The Health Officer of Panama City commenced a survey of the school children of Panama City for *B. diphtheriae* carriers on August 14, 1922. This work was not undertaken with the idea of being exhaustive, but simply to detect and treat the most easily detected carriers. The routine consisted in inspection of throat, taking of throat cultures, and appropriate treatment of carriers of virulent organisms. Nasal cultures were not made, and throat cultures were not repeated in negative cases. Between August 14, 1922, and December 31, 1922, 9,927 throat cultures were made and examined; 223 cultures were positive for bacilli with the morphological and staining characteristics of diphtheria bacilli. In only 129 of these positive cultures were the bacilli present in sufficient numbers to warrant animal inoculation with the primary culture or to permit of the organism being recovered in pure culture. Thirty-four of these cultures were positive for virulent diphtheria bacilli.

SUMMARY.

Throat cultures taken.....	9,927
Cultures containing bacilli with morphology of <i>B. diphtheriae</i>	223
Cultures suitable for animal inoculation.....	126
Cultures which proved to be virulent <i>B. diphtheriae</i>	34

Incidence of tonsillar tuberculosis (primary and secondary lesion).—A comprehensive report on tuberculosis as found in these tissues, both during life and at autopsy was presented by the pathologist at the August meeting of the Medical Association. The incidence of tonsillar tuberculosis in the 1,311 clinical cases reported was 2.21 per cent.

Sugar content of blood.—During the year the chemist began a series of "Studies in the Chemistry of the Blood." A brief report was made on "Some Normal Values of Blood-Sugar in the Tropics," which has not been published yet. This report presented considerable evidence to show that the normal glucose content of the blood is materially higher in the tropics than in the temperate zones.

Bacillus bipolaris septicus (Bacillus bovissepticus), (Pasteurella bovis), was recovered at autopsy from heart's blood and from hip-joint pus of Holstein bull calf from Corozal Dairy, August 1, 1922. The cause of death as found at autopsy was Omphalophlebitis Septica (*Pyo-Septicemia Neonatorum*). This is the first time that this organism has been recovered at this laboratory.

Book binding.—The protocols of all the autopsies performed at this laboratory from October 21, 1904, to October 30, 1922, in number 6,567, were bound in permanent form in 50 volumes. These volumes form an invaluable library of reference and are in constant use. A number of volumes of the most commonly used medical journals were also bound at the same time.

Loan to Department of Agriculture.—The U. S. Department of Agriculture has continued its Field Station on the Isthmus during the year with Mr. James Zetek, specialist in tropical entomology, in charge, assisted by one permanent entomological laboratory assistant, Mr. Ignacio Molino. Two rooms in the laboratory and various laboratory conveniences have been loaned this Field Station.

BACTEROLOGICAL REPORT.

Blood cultures.....	304
<i>B. typhosus</i>	16
<i>Pneumococcus</i> Type I.....	1
<i>Pneumococcus</i> Type IV.....	1
<i>Staphylococcus aureus</i> (5 cases).....	6
<i>Staphylococcus albus</i> (2 cases).....	3
<i>Streptococcus hemolyticus</i>	2
<i>Streptococcus nonhemolytic</i>	1
<i>B. mucosus capsulatus</i> , <i>B. pyocyaneus</i>	1
Stools cultured for typhoid dysentery group.....	2,822
Positive stool cultures.....	93
<i>B. typhosus</i>	58
<i>B. typhosus</i> on carriers (4 carriers).....	19
<i>B. paratyphosus B</i> (1 case).....	2
<i>B. dysenteriae</i> Mannite Fermenter, Group II.....	8
<i>B. dysenteriae</i> Group III (3 cases).....	5
<i>B. dysenteriae</i> unclassified.....	1
Urines cultured for typhoid group.....	1,908
<i>B. typhosus</i>	9
<i>B. typhosus</i> on carrier (1 carrier).....	13
Urines cultured for organisms other than typhoid group.....	226
Positive urine cultures (95 of these <i>B. coli</i>).....	109
Throat cultures for <i>B. diphtheriae</i>	11,493
Positive for <i>B. diphtheriae</i>	383
Nasal cultures for <i>B. diphtheriae</i>	128
Positive for <i>B. diphtheriae</i>	9
Throat cultures for organisms other than <i>B. diphtheriae</i>	11
Spinal fluid cultures.....	114
Positive spinal fluid cultures.....	14
<i>B. influenzae</i> (2 cases).....	8
<i>B. mucosus capsulatus</i>	1
<i>B. subtilis</i>	1
<i>Staphylococcus aureus</i>	1
<i>Staphylococcus albus</i>	1
<i>Streptococcus viridans</i>	1
<i>Staphylococcus aureus</i> , <i>Staphylococcus albus</i> , <i>B. mucosus capsulatus</i> , <i>B. subtilis</i>	1
Cultures from skin lesions.....	12
Autopsies cultured.....	150
Organs, exudates, etc.....	226
Surgical tissues cultured.....	5
Surgical tissue examined for <i>Treponema pallidum</i>	1
Culture from abscess on scalp.....	1
Pus from frontal sinus.....	3
Eye cultures.....	11
Ear cultures.....	29
Mastoid cultures.....	11
Pus from abscess of hard palate.....	1
Culture from left maxillary sinus.....	1
Culture for thrush.....	1
Sputum cultures.....	46
Fluid from wrist joint.....	1
Pus from left shoulder joint.....	1
Pus from left elbow region.....	1
Synovial fluid, left elbow joint.....	1
Pus from lung abscess.....	1
Pus from left chest.....	1
Pus from pleural cavity.....	3
Pleural fluid cultures.....	32
Pus from area over fractured rib.....	1
Culture from abdominal abscess.....	1
Ascitic fluid cultures.....	5
Pus from gallbladder.....	1
Bile.....	8
Pus from liver abscess.....	1
Pus from kidney.....	1
Pus tube.....	1
Pus from vagina.....	1

BACTEROLOGICAL REPORT—Continued.

Pus from groin.....	1
Lymph gland, inguinal.....	1
Cultures for Ducey's bacillus.....	87
Pus from right hip joint.....	2
Knee fluid cultures.....	20
Fluid from ankle joint.....	2
Pus from bone (osteomyelitis).....	1
Milk cultured for bacteriological count.....	663
Ice cream cultured for bacteriological count.....	1
Dark field examinations.....	394
Positive for <i>Treponema pallidum</i>	43
Positive for <i>spirilla similar to those found in Vincent's angina</i>	12
Dark field examinations for yaws.....	5
Positive for <i>Treponema pertenue</i>	1
Dark field examination of sputum.....	1
Conjunctival smears.....	52
Urethral smears.....	82
Vaginal smears.....	19
Cervical smears.....	2
Throat smears.....	331
Positive for <i>fusiform bacillus and spirilla of Vincent's angina</i>	103
Sputum smears for <i>B. tuberculosis</i>	225
Positive for <i>B. tuberculosis</i>	38
Urine examined for <i>B. tuberculosis</i>	13
Spinal fluid examined for <i>B. tuberculosis</i>	11
Positive for <i>B. tuberculosis</i>	1
Smear from ulcer on leg for <i>Leishmania tropics</i>	1
Nasal smear for Vincent's angina.....	1
Membrane from throat.....	1
Examination of ulcer for Leishmann-Donovan bodies.....	2
Examinations of leper suspects.....	27
Positive for <i>B. lepræ</i>	10
Reexamination of lepers.....	2
Examination of lepers previous to parole.....	4
Examination of paroled leper.....	1
Autogenous vaccines prepared.....	94
Feces examined for parasites and ova.....	196
Blood films examined for malarial parasites.....	1,155
Positive for <i>Tertian malarial parasites</i>	218
Positive for <i>E. A. malarial parasites</i>	84
Positive for <i>E. A. and Tertian malarial parasites</i>	1
Positive for <i>Quartan malarial parasites</i>	1
Blood films positive for spirochetes of relapsing fever (6 cases, soldiers, Coroza).....	8
Differential blood counts.....	4
Cell counts on spinal fluids.....	6
Stools for occult blood.....	10
Stomach contents for occult blood.....	1
Fragility test (blood).....	2
Water from Balboa swimming pool.....	108
Water from Coroza swimming pool.....	2
Examination of fish (red snapper).....	1
Machete examined for human blood stains.....	1
Vomit examined.....	1
Milk examined for sediment in bottle.....	1
Miscellaneous smears and examinations.....	114

SEROLOGICAL REPORT.

Wassermann tests.....	16,272
Agglutination tests.....	107
Blood typing for transfusion.....	7
Blood sera prepared by Swift Ellis method for intraspinal injection.....	22
Examination of blood for coagulation time.....	5

WASSERMANN REACTIONS DURING THE YEAR 1922.

During the year 15,455 Wassermann tests were performed on 10,068 persons. The results of these tests are summarized in the following tables.

	Positive.	Negative.	Total.	Per cent positive.
White, civil:				
Males.....	197	1,521	1,718	11.46
Females.....	8	144	152	5.26
Children.....	2	32	34	5.88
White, soldiers, males.....	340	3,273	3,613	9.41
Totals.....	547	4,970	5,517	9.91
Spanish and white natives:				
Males.....	71	342	413	17.19
Females.....	37	167	204	18.13
Children.....	4	26	30	13.33
Totals.....	112	535	647	17.31
Blacks and mulattoes:				
Males.....	551	1,462	2,013	27.37
Females.....	306	1,215	1,521	20.11
Children.....	35	299	334	10.47
Totals.....	892	2,976	3,868	23.06
Chinese, males and females.....	9	27	36	25.00
Grand totals.....	1,560	8,508	10,068	15.49

The figures in the above table are based on the number of individuals examined and not on the number of tests made.

In addition, Wassermann tests were made on 817 spinal fluids from as many individuals, and of these, 202 or 24.72 per cent were positive.

PATHOLOGICAL.

During the year, 262 autopsies were performed at the Board of Health Laboratory. The causes of death were as follows:

General diseases.

Typhoid fever.....	3
Malaria fever, Estivoautumnal.....	3
Malarial fever, Tertian.....	1
Malarial fever, mixed (Estivoautumnal and Tertian).....	1
Whooping cough.....	1
Diphtheria.....	2
Dysentery, Entamebic.....	1
Dysentery, Bacillary.....	3
Leprosy.....	2
Purulent infection and septicemia.....	1
Pyemia.....	1
Septicemia (<i>Staphylococcus albus</i>).....	1
Tetanus.....	1
Pellagra.....	6
Tuberculosis of the lungs.....	17
Acute miliary tuberculosis.....	2

General diseases—Continued:

Tuberculous meningitis.....	1
Tuberculosis of the larynx and trachea, stenosis.....	1
Disseminated tuberculosis.....	8
Rickets.....	2
Syphilis, tertiary.....	4
Syphilis, cerebro-spinal.....	1
Syphilis, hereditary.....	1
Cancer of submaxillary gland and jaw metastases.....	1
Cancer of the stomach.....	2
Cancer of the gall bladder and liver.....	1
Cancer of the female genital organs.....	1
Cancer of the larynx.....	1
Cancer of right bronchus, lung, and pleura metastases.....	1
Cancer of abdominal lymph nodes and liver.....	1
Cancer of left kidney (adrenal cell type).....	1
General sarcomatosis.....	1
Diabetes.....	2
Aplastic anemia.....	1
Acute alcoholism.....	1
Totals.....	78

Diseases of the nervous system and of the organs of special sense.

Abscess of the brain.....	1
Primary combined sclerosis (Putnam).....	1
Acute ascending myelitis (Landry's paralysis).....	1
Posterior sclerosis and central softening of spinal cord.....	1
Cerebral hemorrhage, apoplexy.....	5
Softening of the brain.....	3
General paralysis of the insane.....	8
Convulsions of infants (under 5 years of age).....	2
Cyst of the brain.....	1
Tumor of the brain.....	1
Otitis media and mastoiditis.....	2
Total.....	26

Diseases of the circulatory system.

Acute and chronic endocarditis, aortic.....	1
Organic disease of the heart.....	8
Arteritis, aneurysm and thrombosis left common carotid artery.....	1
Aneurysm.....	2
Arteriosclerosis.....	2
Embolism and thrombosis.....	3
Total.....	17

Diseases of the respiratory system.

Laryngitis.....	2
Broncho pneumonia.....	6
Lobar pneumonia.....	6
Gangrene of the lung.....	1
Abscess of the lung.....	1
Total.....	16

Diseases of the digestive system.

Stomatitis.....	1
Phlegmonous tonsillitis.....	1
Ulcer of the stomach.....	1
Diarrhea and enteritis (under 2 years).....	4
Diarrhea and enteritis (2 years and over).....	2
Acute appendicitis.....	2

Diseases of the digestive system—Continued:

Intestinal obstruction.....	3
Fistula in ano, right. Ischio rectal abscess.....	1
Ischio rectal abscess.....	1
Duodenal ulcer.....	1
Cirrhosis of the liver.....	1
Simple peritonitis (nonpuerperal).....	2
Total.....	20

Nonvenereal diseases of the genito-urinary system and annexa.

Acute nephritis.....	1
Chronic nephritis (Bright's disease).....	9
Pyonephritis, acute.....	3
Purulent salpingitis.....	1
Salpingo-oophoritis, suppurative. Pyemia.....	1
Total.....	15

The puerperal state.

Autointoxication of pregnancy.....	1
Secondary anemia (Postpartum hemorrhage).....	1
Puerperal septicemia.....	1
Eclampsia.....	3
Total.....	6

Diseases of the bones and of the organs of locomotion.

Osteomyelitis, acute and chronic.....	1
Periostitis, acute suppurative.....	1
Total.....	2

Malformations.

Congenital malformation of the heart.....	3
Congenital malformations.....	1
Total.....	4

Diseases of early infancy.

Premature birth.....	10
Malnutrition.....	27
Cerebral hemorrhage, a consequence of labor.....	1
Brain injury and hemorrhage, labor accident to fetus.....	1
Atelectasis neonatorum.....	1
Total.....	40

Affections produced by external causes.

Suicide by poisoning.....	2
Suicide by drowning.....	1
Suicide by railroad crushing.....	1
Arsenical poisoning.....	1
Burns (conflagration excepted).....	2
Accidental drowning following electric shock.....	1
Traumatism by firearms.....	1
Traumatism by a fall.....	3
Traumatism by motor vehicle crushings.....	2
Accidental electrocution.....	1
Homicide by firearms.....	2
Homicide by a blow (fracture of skull).....	1
Traumatism by falling body (fracture of cervical vertebrae).....	1
Total.....	19

Ill-defined diseases.

Respiratory failure, cause undetermined.....	1
Total.....	1

Appendix.

Stillbirths.....	14
Nonviable fetus.....	4
Total.....	18
Grand total.....	262

The most frequent causes of death found at autopsy for the year were:

	Cases.	Per cent.
Tuberculosis.....	29	11.0
Malnutrition in infants.....	27	10.3
External forms of violence.....	19	7.2
Syphilis, various forms.....	15	5.7
Pneumonia.....	14	5.3
Organic heart diseases.....	12	4.5
Cancer.....	10	3.8
Chronic nephritis.....	9	3.4

Table showing the more common causes of death at autopsy in the Board of Health Laboratory.

Date.	Number of autopsies per year.	Pneumonia.	Tuberculosis.	Hemoglobinuric fever and malaria.	Affections produced by external causes.	Chronic nephritis.	Combined types of dysentery.	Organic heart disease.	Typhoid.	Diarrhea and enteritis (in children).	Cancer.
1904.....	6	1	1								
1905.....	269	60	9	27	3	8	5	3	9		2
1906.....	509	191	22	50	24	23	39	15	33		2
1907.....	496	156	35	27	40	27	36	12	58	4	4
1908.....	361	59	63	46	26	25	23	11	14		7
1909.....	295	55	37	26	32	31	11	17	11	1	5
1910.....	451	50	91	52	30	37	36	16	10	6	4
1911.....	508	83	102	41	38	36	19	20	9	11	11
1912.....	425	53	79	23	37	27	15	22	6	7	11
1913.....	460	47	89	21	34	26	8	26	5	23	12
1914.....	375	36	78	6	38	12	6	27	5	14	3
1915.....	328	28	56	14	20	12	5	14	2	15	10
1916.....	323	25	81	8	17	20	7	10	6	9	7
1917.....	330	24	51	5	21	23	3	18	1	3	5
1918.....	253	38	68	6	6	12		8		1	5
1919.....	324	22	55	3	15	14	3	20	3	10	11
1920.....	334	46	55		29	11	5	16			6
1921.....	289	14	37	4	16	5	8	17	2	4	7
1922.....	262	14	29	5	19	9	4	9	3	6	10
Totals...	6,598	1,002	1,038	364	445	358	233	281	177	114	122

* This includes 32 cases of influenza.

Table showing number of autopsies performed, revealing the following diseases per year.

Date.	Autopsies performed per year.	Yellow fever.	Beriberi.	Ankylostomiasis.	Tetanus.	Infectious diseases of children.	Plague.	Smallpox.
1904.....	6							
1905.....	269	12	7	7	2		1	
1906.....	509	1	5	4				
1907.....	496		1	2	1			
1908.....	361		1	2	3			
1909.....	295	2					1	
1910.....	451	2						
1911.....	508		1	1	1		1	
1912.....	425	1			1	4		
1913.....	460			2	3	1		
1914.....	375		1		4	2		
1915.....	328	3	1		2	1		
1916.....	323		2			3		1
1917.....	330		7		1	2		
1918.....	253			2		3		
1919.....	324	2				3		
1920.....	334					1		
1921.....	289					2		2
1922.....	262				1	3		
Totals.....	6,598	23	26	20	19	25	3	3

* Scarlet fever. * All non-residents, since 1905,

Three hundred and fifty-six bodies passed through the laboratory during the year 1922; 262, or 73.5 per cent were autopsied.

Malaria carriers found at autopsy..... 17

Syphilis.—There were 60 cases in the 262 autopsies, or 22.9 per cent, which responded either during life or at autopsy or both in a positive manner to the Wassermann test:

Cases with positive Wassermann test and positive for syphilitic lesions..... 48
Cases with positive Wassermann test and no definite syphilitic lesions..... 12

Intestinal parasites.—There were 23 cases in the 262 autopsies showing one or more forms of parasites, or 8.8 per cent:

<i>Tricocephalus</i>	14	<i>Strongyloides</i>	5
<i>Uncinaria</i>	12	<i>Clonorchis sinensis</i> (Chinaman).....	1
<i>Ascaris</i>	12		

Leprosy.—There were 5 lepers in the autopsy series. Their causes of death are given in the table below:

Autopsy No.	Cause of death.	Contributory causes.
6346	Chronic nephritis.....	Tertiary syphilis, leprosy, and duodenal ulcers.
6443	Leprosy.....	None.
6449	Leprosy.....	Chronic nephritis, senility.
6511	Pellagra.....	Tertiary syphilis, leprosy of bones of nose.
6565	Tertiary syphilis.....	Leprosy, chronic nephritis.

Microscopic examinations and reports on surgical specimens.

Tonsils (pairs).....	249
Tonsils (pairs) and adenoids.....	199
Adenoids.....	14
Specimens from skin of head (scalp).....	4
Specimens from the eye.....	4
Specimens from the eyelid.....	2
Specimens from nose (nares).....	53
Specimens from nose (cutaneous).....	2
Specimens from external ear and canal.....	1
Specimens from skin of face (nose and ear excepted).....	9
Specimens from oral cavity (tonsils and adenoids excepted).....	20
Specimens from skin of neck.....	1
Specimens from thyroid glands.....	3
Specimens from epiglottis.....	2
Specimens from oesophagus.....	1
Specimens from the larynx.....	2
Specimens from fistula at left side of neck.....	1
Specimens from skin of right axilla.....	2
Specimens from upper extremities.....	13
Specimens from lower extremities.....	14
Specimens from wall of thorax.....	1
Specimens from the breasts.....	9
Specimens from the pleural cavity.....	3
Specimens from the abdominal wall and skin.....	3
Specimens from the stomach.....	2
Specimens from the intestines.....	11
Specimens from the omentum.....	2
Specimens from the mesentery.....	1
Specimens from the pancreas.....	1
Specimens from the liver.....	1
Specimens from the kidney.....	3
Specimens from hernial sac.....	1
Specimens from epididymis.....	1
Specimens from spermatic cord.....	2
Specimens from the penis.....	5
Specimens from the scrotum.....	1
Specimens from bones.....	3
Specimens from the vagina.....	2
Specimens from the rectum and anus.....	9
Polypus.....	1
Specimens from the skin, origin not stated.....	2
Fetus.....	2
Eyes.....	5
Thyroid glands.....	5
Breasts.....	2
Gallbladders.....	4
Spleens.....	2
Kidney.....	1
Kidney and ureter.....	1
Ureter.....	1
Appendices.....	212
Umbilicus.....	1
Prostate gland.....	1
Testicle and cord (old case).....	1
Testicle and epididymis.....	1
Uterus and appendages.....	46
Uterus and ovary.....	1
Uterus.....	5
Cervix uteri.....	12
Specimens passed from or taken from the uterus.....	31
Tubes and ovaries.....	12
Tubes and one ovary.....	7
Tube and ovary.....	1
Tubes.....	32
Ovaries.....	18
Lymph nodes, submaxillary region.....	2
Lymph nodes, cervical.....	10
Lymph nodes, axillary.....	3
Lymph nodes, abdominal.....	2

Microscopic examinations and reports on surgical specimens.—Contd.

Lymph nodes, inguinal.....	14
Lipoma, region not stated.....	1
Autopsy sets of tissue (from other hospitals).....	29
Placenta.....	1

Total..... 1,126

PRINCIPAL LESIONS ENCOUNTERED IN SURGICAL SPECIMENS OTHER THAN
INFLAMMATORY.

Malignant tumors (cancer.)

Scalp.....	1
Face (skin).....	7
Mouth, lips, or tongue.....	5
Cervical lymph nodes.....	4
Axillary lymph nodes.....	1
Breast.....	9
Lung and pleura.....	1
Finger (skin).....	2
Stomach.....	1
Intestine.....	2
Mesentery.....	1
Omentum.....	1
Appendix.....	1
Kidney.....	1
Prostate gland.....	1
Ovary.....	1
Uterus.....	3
Vagina.....	2
Hydatidiform mole (placenta tissue only examined).....	1
Leg.....	1
Total.....	46

Benign tumors.

Uterus (fibro myomata).....	27
Cysts of ovary.....	22
Moles, warts, etc.....	17
Polyp of nasal mucosa.....	6
Polyp of endometrium.....	5
Sebaceous cysts.....	5
Cystic thyroid glands.....	4
Cystic thyroglossal duct.....	1
Cystic tumor of lower maxilla.....	1
Fibroma of breast.....	3
Lipomata.....	2
Adeno-fibro-myxoma of lip.....	1
Hemangioma of gum.....	1
Epulis.....	1
Hemangioma of finger.....	1
Hemangioma of arm.....	1
Colloidal struma.....	1
Cysts of cervix.....	1
Fibroma molluscum.....	1
Hydatidiform mole.....	1
Dermoid cyst of orbit.....	1
Total.....	103

Specimens showing tuberculosis.

Cervical lymph nodes.....	6
Tonsils and adenoids.....	4
Tonsils.....	7
Adenoids.....	2
Cornea and sclera.....	1

Specimens showing tuberculosis.—Continued

Uvula.....	1
Larynx.....	1
Submaxillary lymph nodes.....	1
Sinus of chest.....	1
Tendon and wrist joint.....	1
Appendix.....	1
Tubes and ovaries.....	1
Testicle and epididymis.....	1
Sinus from spermatic cord.....	1
Glans penis.....	1
Skin (lupus).....	1
Total.....	31

Other infrequent lesions encountered.

Nasal muco-cutaneous leishmaniasis.....	1
Dermal leishmaniasis.....	1
Concretion from sublingual duct.....	1
Branchial cyst.....	1
Hodgkin's disease, cervical lymph nodes.....	1
Leprosy of finger.....	1
Leprosy of toe.....	1
Hemorrhagic infarctions of small intestines.....	1
Appendix with two cicatricial diverticula at tip.....	1
Appendix with numerous raisin stones causing miliary ulceration of the mucosa.....	1
Appendicitis with oxyuris vermicularis present.....	2
Appendicitis, amebic.....	1
Traumatic rupture of the spleen (entire organ resected).....	1
Esplenomegalia, tropical.....	1
Intra-hepatic cholelithiasis.....	1
Gallstones and gall bladder from <i>B. typhosus</i> carrier.....	1
Amebic abscess of liver.....	1
Ectopic pregnancy, tubal.....	5
Ectopic pregnancy, tubal, ruptured.....	2
Ectopic pregnancy, ovarian.....	1
Papillary-cystadenoma of the ovary.....	1
Cystic kidney with kinked ureter.....	1
Acute inflammation of umbilical tissue of 9-day old baby.....	1
Mycosis of plantar skin.....	1
Total.....	30

Miscellaneous human examinations.

Placental blood films (5 positive for malaria).....	250
Blood examined for filaria.....	15
Films from tissue, granuloma inguinale suspect, negative.....	1
Differential blood counts.....	2
Contents of cyst of neck.....	1
Total.....	269

Animals (wild and domestic), bacteriological examinations.

Cattle spleens examined for <i>B. anthracis</i>	3
Nasal secretion from horse ("strangles" suspect) (positive for <i>Streptococcus equi</i>).....	1
Spleen and muscle from steer (Farfan pasture) (Positive for <i>B. anthracis</i> symptomatic, blackleg).....	1
Cultures of guinea pig spleens (50 positive for <i>B. paratyphosus</i> B).....	149
Muscle tissue (pleural tumor).....	1
Total.....	155

Animals (wild and domestic), miscellaneous examinations.

Blood films from cattle.....	36
Brain films from cattle.....	2
Blood films from horses and mules.....	32

Animals (wild and domestic), miscellaneous examinations.—Contd.

Blood films from dogs.....	17
Urine from dogs.....	10
Stool from dogs.....	12
Casts from dog rectum.....	2
Blood taken for inoculation of imported Holstein cow against local form of piroplasmosis.....	1
Blood films from relapsing fever-infected animals.....	930
Forage inspection for insects and fungus.....	1
Lung and bronchial gland of steer.....	1
Brain film from dog.....	1
Brain and spleen from heifer calf.....	1
Dogs held under observation.....	2
Opossums examined for ectoparasites.....	7
Carcinoma of pleura of mule (histological).....	1
Tumor growth from spine of shark (<i>Osteoma</i>).....	1
Total.....	1,057

Animals (wild and domestic), autopsies.

Dogs.....	15
Cats.....	2
Rats.....	2
Guinea pigs.....	257
Fowls.....	17
Birds.....	3
Cattle (5 positive for tuberculosis).....	15
Alligator.....	1
Ocelot (<i>Tigre chico</i>).....	1
Monkey.....	1
Horse.....	1
Total.....	315

The principal diseases encountered that were important among domestic animals were as follows:

Horses.—Strangles.

Cattle.—Tuberculosis; piroplasmosis; blackleg; actinomycosis.

Guinea pigs.—Paratyphoid B. infection.

Rats examined.....	13,979
<i>Mus musculus</i>	6,093
<i>Mus norvegicus</i>	2,171
<i>Mus alexandrinus</i>	1,755
<i>Mus rattus</i>	3,376
<i>Mus rattus</i> and <i>Mus norvegicus</i>	537
<i>Sigmodon hispidus chiriquensis</i>	47

Microscopic slides prepared.

Surgical preparations (149 frozen).....	4,667
Autopsy preparations, human (45 frozen).....	2,693
Animal tissue preparations (4 frozen).....	520
Total.....	7,880

Photographs taken during the year.

Films and plates taken of lepers at Palo Seco (taken by Dr. Philip Horwitz).....	156
Photographs taken at Board of Health Laboratory.....	23

CHEMICAL DEPARTMENT.

Arsenical cattle dip.....	3
Alcohol.....	6
Acid, sulfuric, for electrolyte.....	1

CHEMICAL DEPARTMENT—Continued.

Ascitic fluid, for arsenic.....		1
Blood specimens examined.....		677
Nonprotein nitrogen determinations.....	544	
Urea nitrogen determinations.....	558	
Uric acid determinations.....	557	
Creatinin determinations.....	557	
Glucose determinations.....	627	
Phosphorous determinations.....	23	
Cholesterin determinations.....	5	
Sodium chloride determinations.....	1	
Carbon dioxide determinations.....	3	
Arsenic determinations.....	1	
Beverages, alcohol content.....		3
Calibration of renal function standards.....		1
Calculi examined.....		4
Sublingual.....	1	
Biliary.....	2	
Renal.....	1	
Cottonseed meal.....		1
Carbolic acid, crude.....		2
Duodenal fluid.....		1
Foodstuffs examined.....		150
Butter.....	4	
Feeding, infant.....	1	
Ice cream.....	21	
Flour.....	1	
Mother's milk.....	17	
Milk, dairy.....	63	
Milk, condensed, sweetened.....	4	
Milk, evaporated, unsweetened.....	6	
Milk, dairy, for formaldehyde.....	30	
Tomato paste.....	1	
Vinegar.....	2	
Formaldehyde.....		1
Feces.....		1
Gasoline.....		1
Gastric analyses.....		37
Hide, for mercury.....		1
Oil, mineral.....		1
Quinine sulfate.....		1
Quinine solution.....		1
Specimens for identification.....		52
Cocaine hydrochloride.....	40	
Aspirin.....	1	
Opium.....	3	
Tartar emetic.....	1	
Cholesterin from cystic fluid.....	1	
Sodium sulfate.....	1	
Liquid for narcotics.....	1	
Liquor, "Chartreuse".....	2	
Liquor, "Benedettino".....	1	
Spinal fluids examined.....		737
Colloidal gold.....	730	
Ammonium sulfate.....	719	
Phenol.....	728	
Arsenic.....	4	
Glucose.....	3	
Shot.....		1
Sediment from storage battery.....		1
Toxicological examinations.....		7
Human autopsy 6383, hydrocyanic acid detected.....	1	
Human autopsy 6579, veronal only detected.....	1	
Human autopsy 6574, ethyl alcohol only detected.....	1	
Human autopsy 6405, methyl alcohol not detected.....	1	
Animal autopsy 2092, elementary phosphorus detected.....	1	
Stomach contents, elementary phosphorus detected.....	1	
Stomach contents, salicylic acid detected.....	1	
Turpentine mixture.....		2
Toxicity test of arsphenamine.....		1

CHEMICAL DEPARTMENT—Continued.

Urine examined.....		252
Routine examinations.....	173	
Glucose determinations.....	58	
Urea determinations.....	5	
Total nitrogen determinations.....	3	
Ammonia nitrogen determinations.....	3	
Nitrogen partition determinations.....	1	
Amino acid determinations.....	1	
Acetone determinations.....	6	
Acetone bodies determinations.....	1	
Lead determinations.....	4	
Renal function determinations.....	1	
Chyle determinations.....	4	
Indican determinations.....	1	
Bence-Jones protein determinations.....	1	
Specific gravity determinations.....	3	
Water.....		1
Water, distilled.....		1
Water, for coloring matter.....		1
Alcohol recovered, gallons.....		21
95 per cent ethyl.....	14	
Absolute ethyl.....	7	
Ethyl esters of chaulmoogric acids prepared, c. c.....		34,708

UNDERTAKING DEPARTMENT.

Number of bodies received (2 disinterred).....	358
Number of bodies embalmed.....	44
Number of bodies cremated.....	124
Number of bodies buried on Isthmus.....	202
Number of bodies shipped from Isthmus.....	26

ADMISSION RATE PER 1,000 EMPLOYEES.

HOSPITALS AND QUARTERS.

ALL CAUSES.

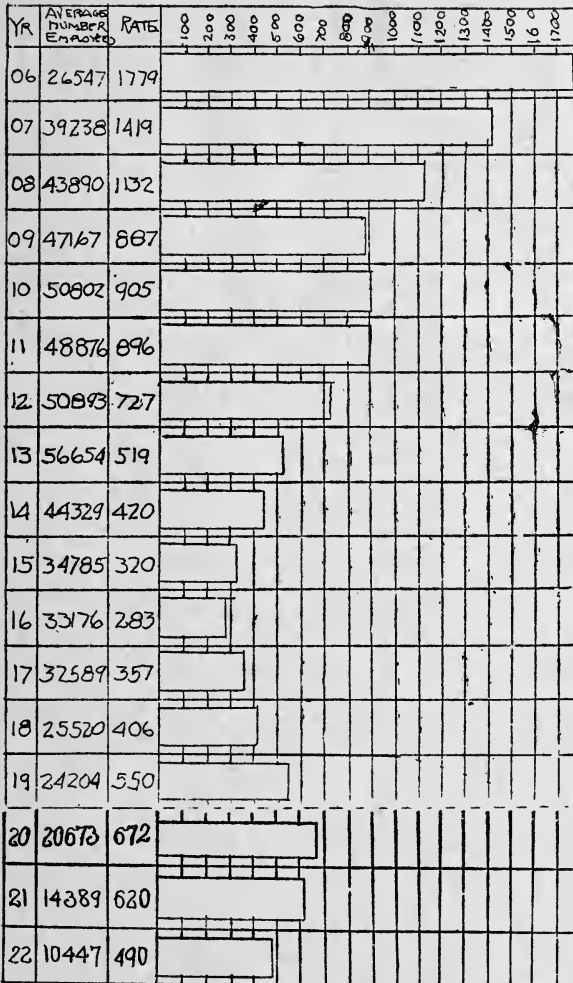


CHART NO. 1.

DEATH RATE PER 1,000 EMPLOYEES.

ALL CAUSES.

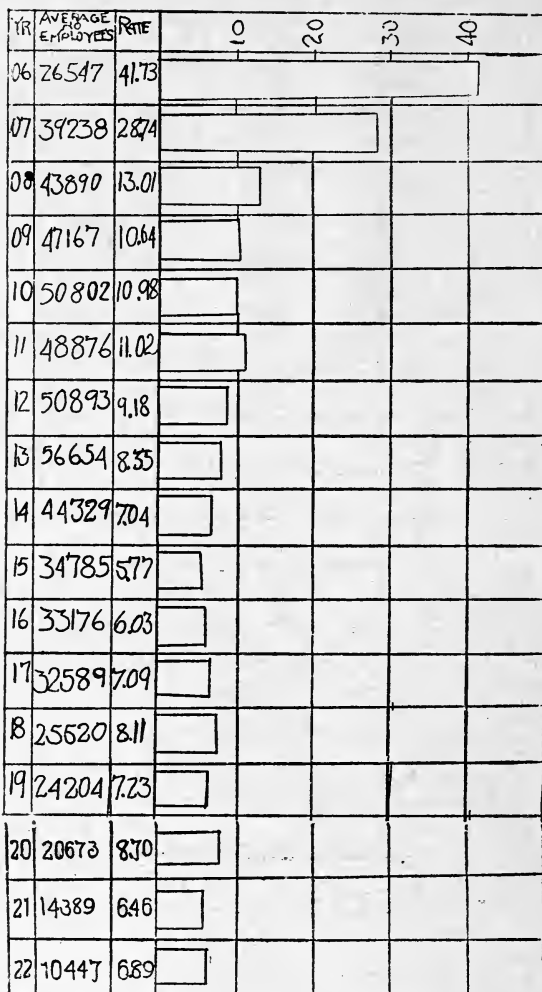


CHART No. 2.

NONEFFECTIVE RATE PER 1,000 EMPLOYEES.

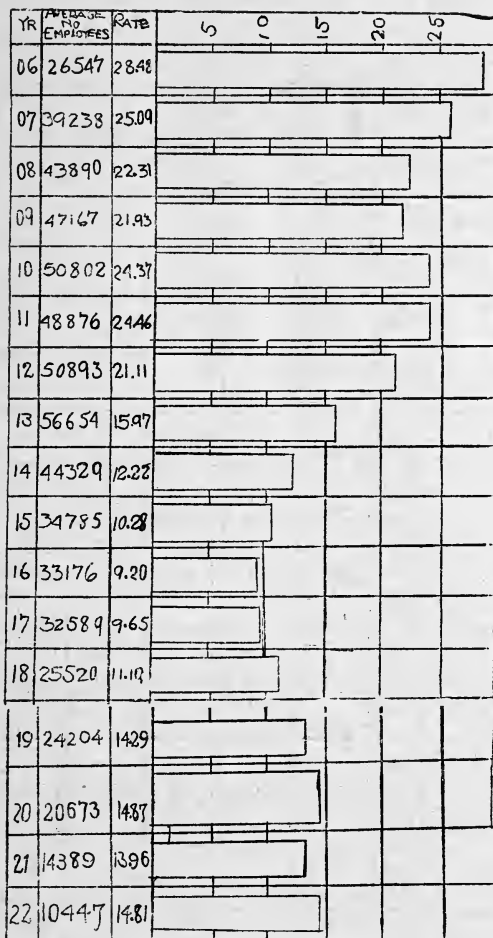


CHART NO. 3.

MALARIAL FEVER

ADMISSION RATE PER 1,000 EMPLOYEES.

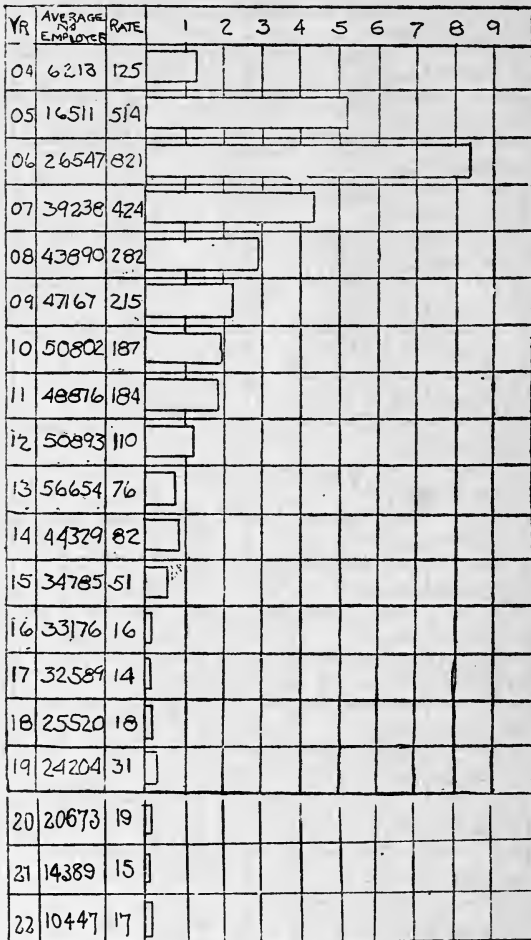


CHART No. 4.

MALARIAL FEVER.

DEATH RATE PER 1,000 EMPLOYEES.

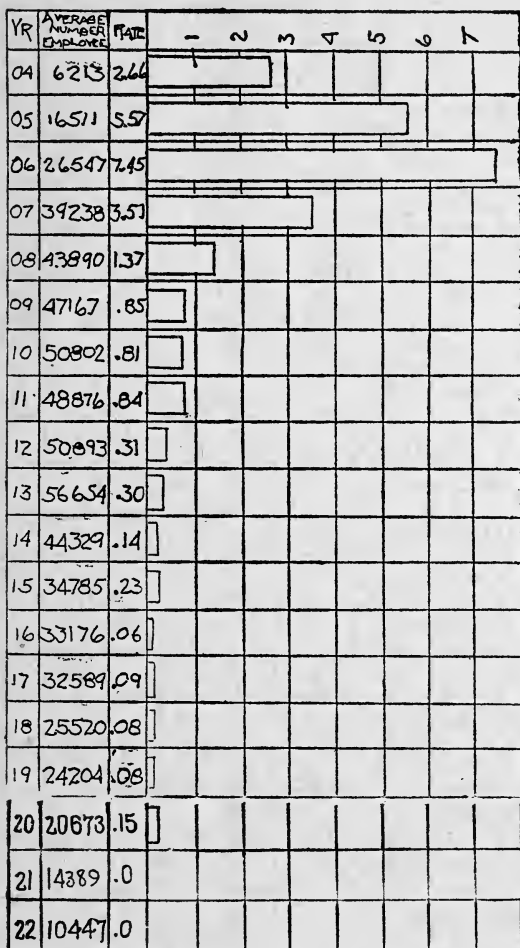


CHART No. 5.

MALARIAL FEVER.

DEATH RATE PER 1,000 POPULATION IN THE CANAL ZONE
AND THE CITIES OF PANAMA AND COLON.

EMPLOYEES AND NONEMPLOYEES.

YR.	POPULATION	RATE	1.	2	3	4	5	6	7	8	9
06	73264	9.49									
07	102133	5.37									
08	120097	3.36									
09	135180	2.07									
10	151591	1.89									
11	156936	1.82									
12	146510	1.64									
13	129104	1.32									
14	123592	1.27									
15	121650	.51									
16	116918	.21									
17	114003	.18									
18	109707	.18									
19	113958	.16									
20	114037	.08									
21	120668	.10									
22	122559	.15									

TABLE I.—DISCHARGES FROM HOSPITALS, DEATHS, AND NONEFFECTIVE RATES FOR EMPLOYEES.

ABSOLUTE NUMBERS.

	Average number of employees.	Discharges from hospitals.			Deaths.			Noneffective from sickness.	
		Total.	Disease.	External causes.	Total.	Disease.	External causes.	Days treated.	Constantly noneffective.
Year, 1922:									
White.....	2,827	558	508	50	13	10	3	12,942	35.46
Colored.....	7,620	1,135	949	244	59	54	5	43,546	119.30
Totals.....	10,447	1,751	1,457	294	72	64	8	56,488	154.76
Year 1921:									
White.....	3,855	1,040	950	90	13	10	3	21,957	60.16
Colored.....	10,534	1,999	1,645	354	80	72	8	51,343	140.67
Totals.....	14,389	3,039	2,595	444	93	82	11	73,300	200.83

PROPORTIONATE NUMBERS. ¹

Year 1922:									
White.....	2,827	197.39	179.70	17.69	4.60	3.54	1.06	.....	12.54
Colored.....	7,620	156.56	124.54	32.02	7.75	7.09	.66	.....	15.66
Totals.....	10,447	167.61	139.47	28.14	6.89	6.13	.77	.....	14.81
Year 1921:									
White.....	3,855	269.78	246.43	23.35	3.37	2.59	0.78	.....	15.61
Colored.....	10,534	183.77	156.16	33.61	7.59	6.83	.76	.....	13.35
Totals.....	14,389	211.23	180.35	30.85	6.46	5.70	.76	.....	13.96

¹ Annual average per 1,000 employees.

TABLE II.—CAUSES OF DEATHS OF EMPLOYEES ARRANGED WITH

Cause of death.	Color.		Age (in years).					
	White.	Black.	15-20	21-25	26-30	31-35	36-40	41-45
Septicemia.....		1			1			
Tuberculosis of the lungs.....		8			1	2	1	2
Tuberculosis of the larynx.....		1				1		
Disseminated tuberculosis.....		3				2	1	
Syphilis, tertiary.....		2				1		
Syphilis, period not stated.....	1							
Cancer of the buccal cavity.....		1						
Cancer of stomach.....		1						
Cancer of the intestines.....	1							
Cancer of other organs.....	2	1				1		
Anemia, primary, pernicious.....		1						
Cerebral hemorrhage, apoplexy.....	1	5					1	1
Softening of the brain.....		1						
General paralysis of the insane.....		1		1				
Organic diseases of the heart.....		9		1		1	2	
Diseases of the arteries.....		1				1		
Aneurysm.....		2					1	
Arterio sclerosis.....		1						1
Embolism and thrombosis.....	2	2					1	1
Broncho-pneumonia.....		1					1	
Lobar-pneumonia.....		1						1
Empyema.....		1						
Abscess of the lungs.....	1							
Ulcer of the stomach.....	1	2				1	1	1
Acute appendicitis.....		3				2		
Intestinal obstruction.....	1							
Cirrhosis of the liver.....		1				1		
Acute nephritis.....		4				1	2	1
Suicide.....		1						1
Conflagration.....		1			1			
Traumatism by fall.....	1							1
Traumatism by crushing.....	2	1				1	1	
Electricity (lightning excepted).....		1	1					
Other external violence.....		1				1		
Totals.....	13	59	1	2	3	16	12	10

REFERENCE TO COLOR, AGE, AND LENGTH OF RESIDENCE ON ISTHMUS.

Age (in years)— Continued,				Length of residence on Isthmus (in years).												Unknown.	Total.
46-50	51-55	56-65	66-75	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-10	10-15	Over 15.	Life.			
1		1									1	4	1			1	1
												1				2	8
																1	1
1											2					1	3
		1								1						1	2
1													1				1
			1										1				1
1													1				1
	2			1								1				1	1
1											1					1	3
1		3										2				3	1
			1										1				6
																1	1
	2	3										2	3			4	9
																1	1
1											1					1	2
																1	1
	1	1								1			2			1	4
													1				1
													1				1
		1											1				1
1												2					3
												1	1				3
1		1										1				2	1
												1					1
												1	2			1	4
																1	1
																1	1
																1	1
	1															3	3
																1	1
																1	1
9	6	11	2	1						2	5	16	18			30	72

TABLE III.—DEATHS OF RESIDENTS AND DEATH RATES, OF THE CITIES OF PANAMA AND COLON, AND THE CANAL ZONE.

Place.	Average population.	Deaths.			Annual rate per 1,000 population.		
		Total.	Disease.	External causes.	Total.	Disease.	External causes.
Year 1922:							
Panama.....	60,068	1,279	1,241	38	21.29	20.66	.63
Colon.....	31,393	445	421	24	14.17	13.41	.76
Canal Zone.....	31,098	254	220	34	8.17	7.08	1.09
Totals.....	122,559	1,978	1,882	96	16.14	15.36	.78
Year 1921:							
Panama.....	60,500	1,336	1,286	50	22.09	21.26	.83
Colon.....	28,789	497	468	29	17.26	16.25	1.01
Canal Zone.....	31,377	236	211	25	7.52	6.72	.80
Total.....	120,666	2,069	1,965	104	17.15	16.29	.86

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>General diseases.</i>									
Typhoid fever.....	2	3		5				1	2
Malaria.....	1	2	1	2		1	1		
Malarial fever, Estivoautumnal.....	6	6	4	8		1	3	1	2
Malarial fever, Tertian.....	1			1			1		
Malarial fever, mixed.....	1			1				1	
Malarial fever, Cachexia.....		1		1					1
Whooping cough.....	1			1			1		
Diphtheria and croup.....	5	4	1	8		1	7	1	
Influenza.....	2	1	1	2				1	
Cholera nostras.....		1		1					1
Dysentery.....		1		1					
Dysentery, entamebic.....	4	3		7			2		
Dysentery, bacillary.....	3	2	1	3	1	1	1		
Leprosy.....	4	1		5					
Erysipelas.....	1			1		1			
Purulent infection and septicemia.....		1		1					
Pyemia.....	1	1		2		1			
Septicemia.....	3	2		5		1	1		
Tetanus.....	4			4		1	1	1	
Pellagra.....	5	13		18					1
Beriberi.....		2	1	1			2		
Tuberculosis of the lungs.....	150	134	23	253	8	2	11	1	14
Acute miliary tuberculosis.....	4	4		7	1	1	1		
Tuberculous meningitis.....	3	8	1	10		2	6	3	
Abdominal tuberculosis.....		4	1	3			1	1	
Tuberculosis of other organs.....	1			1			1		
Tuberculosis of the larynx.....	2			2					
Tuberculosis of the lymph glands.....		2		2					1
Disseminated tuberculosis.....	12	5	1	16		2	4		1
Rickets.....	2	1		3		3			
Syphilis, secondary.....		1		1		1			
Syphilis, tertiary.....	16	7	5	18					
Syphilis, hereditary.....	7	8		15		11	2		1
Syphilis, period not stated.....	3		1	2					
Cancer and other malignant tumors of the buccal cavity.....	2	2		4					
Cancer and other malignant tumors of the stomach and liver.....	12	5	6	11					
Cancer and other malignant tumors of the peritoneum, intestines, rectum.....	2	3	1	4					
Cancer and other malignant tumors of the female genital organs.....		27	3	24					
Cancer and other malignant tumors of the breast.....		2	1	1					
Cancer and other malignant tumors of the skin.....	2			1	1				
Cancer and other malignant tumors of other organs and of organs not specified.....	11	6	5	12			1		1

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
1		1					1	2	2	5
	1						2	1		3
2	1	2					4	1	7	12
							1			1
								1		1
								1		1
							1			1
							6	1	2	9
	1				1		3			3
							1			1
		1					1			1
	1	2		2			6		1	7
	2			1			3		2	5
	1	2		2			1		4	5
								1		1
	1							1		1
		1					1		1	2
1		2					1	1	3	5
			1				2	1	1	4
6	6	2	1	2			8	7	3	18
							2			2
85	100	41	19	8	2	1	202	65	17	284
4	1	1					2	5	1	8
							7	2	2	11
1	1						3	1		4
							1			1
	2						1		1	2
1							2			2
1	7	2					8	7	2	17
								1	2	3
								1		1
5	6	7	3	1		1	13	7	3	23
	1						9	4	2	15
1		1	1				1	2		3
	1	1		1	1		3		1	4
1	4	3	6	2		1	12	3	2	17
2	1	2					4		1	5
3	3	5	6	7	2	1	24	2	1	27
	1			1			1	1		2
			1	1			2			2
	4	4	6	1			12	1	4	17

TABLE IV. —DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>General diseases.—Continued.</i>									
Acute articular rheumatism.....	1	1	1	1		1			
Chronic rheumatism and gout.....		1		1					
Diabetes.....	1	6	1	6					
Leukemia.....	3	1	1	3				2	
Hodgkin's disease.....		1		1					
Anemia, primary, pernicious.....	3	1		4		2			
Anemia, secondary, cause not determined.....	1			1			1		
Other general diseases.....	1			1		1			
Alcoholism.....	1				1				
<i>Diseases of the nervous system and of the organs of special sense.</i>									
Encephalitis.....	1			1					
Simple meningitis.....	5	5	3	7		2	4	1	2
Cerebro-spinal fever.....	1	1		2		1		1	
Pneumococcus meningitis.....	3	1		4				1	
Other diseases of the spinal cord.....	2	2	2	2					1
Cerebral hemorrhage, apoplexy.....	24	27	9	40	2				
Softening of the brain.....	3	1		4					
Paralysis without specified cause.....	2	1		3					
General paralysis of the insane.....	7	1	1	7					
Epilepsy.....	1	1	1	1					1
Convulsions of infants (under 5 years of age).....	6	3	2	7		2	7		
Other diseases of the nervous system.....	1		1					1	
Tumor of the brain.....	2	1	1	2					
Otitis media.....	4	3	1	6		4	1		2
<i>Diseases of the Circulatory system.</i>									
Pericarditis.....	3	2	1	4		1			1
Acute endocarditis.....	1	2	1	2		1			2
Malignant endocarditis.....	1	1		2					
Organic diseases of the heart.....	61	45	23	83		2	1	1	3
Angina pectoris.....	2	2	1	3					
Diseases of the arteries, atheroma, aneurysm, etc.....	1			1					
Aneurysm.....	13	3	1	15					
Arterio-sclerosis.....	7	5	1	11					
Embolism and thrombosis.....	7	1	3	5					
Other diseases of the veins.....		1		1					
Varices.....	1			1		1			
Laryngitis.....	2			2			1		
Diseases of the thyroid body.....		1	1						
Acute bronchitis.....	22	14	2	34		24	11	1	
Chronic bronchitis.....		5	1	4			1		
Broncho-pneumonia.....	57	51	8	99	1	51	38	6	1
Pneumonia (unqualified).....	16	5	5	16		1	6		3
Lobar pneumonia.....	59	24	8	75		8	8	1	7
Pleurisy.....	6	1	1	6					
Empyema.....	4	1		5		1	1		
Pulmonary congestion, pulmonary apoplexy.....		3	1	2		1			
Gangrene of the lungs.....	1	2		3					

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age unknown.	Panama.	Colon.	Canal Zone.	Total.
1							1	1		2
		1					1			1
	4		2	1			3	1	3	7
	2						4			4
1								1		1
		2					2		2	4
							1			1
									1	1
1							1			1
			1					1		1
			1				7	2	1	10
							2			2
1	1	1					3	1		4
1	2						1	1	2	4
1	10	12	9	14	2	3	26	20	5	51
		1		3			1	1	2	4
		2	1				2	1		3
2	3	2		1			3	1	4	8
1							2			2
							1	1	7	9
							1			1
	1	2					2		1	3
							4	1	2	7
	1	1	1				2	2	1	5
							3			3
		2					2			2
9	27	16	28	15	4		71	30	5	106
1	1	1	1				4			4
3	1	4	2				7	1		1
	7							8	1	16
	2	2	3	4	1		8	3	1	12
1	3	1	2			1	3	1	4	8
1							1			1
			1				1			1
									2	2
		1							1	1
			1				19	14	3	36
			1	1	2		2	2	1	5
5	1		3	1	2		86	15	7	108
2		2	2	4	1		20	1		21
23	15	7	9	4	1		62	15	6	83
	3	2		2			5	2		7
	1	1	1				4		1	5
				2						
							1	2		3
1	1	1					3			3

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>Diseases of the respiratory system.—Continued.</i>									
Other diseases of the respiratory system (tuberculosis excepted)	3	1	2	2	.....	3	.....	.....	.....
Abscess of lungs	3	2	1	4	.....	.....	.....	.....	.....
<i>Diseases of the digestive system.</i>									
Diseases of the pharynx	.....	2	.....	2	.....	.....	1	.....	.....
Stricture of the esophagus	.....	1	.....	1	.....	.....	.....	.....	.....
Ulcer of the stomach	7	.....	1	6	.....	.....	.....	.....	.....
Acute gastritis	4	6	1	9	.....	6	1	.....	.....
Chronic gastritis	1	.....	.....	1	.....	.....	.....	.....	.....
Acute indigestion	2	2	.....	4	.....	3	1	.....	.....
Diarrhea and enteritis (under 2 years)	98	73	20	151	.....	122	49	.....	.....
Colitis	9	2	.....	11	.....	8	3	.....	.....
Diarrhea and enteritis (2 years and over)	7	9	4	12	.....	.....	7	1	.....
Colitis	.....	4	.....	4	.....	1	1	.....	.....
Ascariasis	.....	1	.....	1	.....	.....	1	.....	.....
Appendicitis and typhlitis	2	.....	.....	2	.....	.....	.....	.....	.....
Acute appendicitis	9	2	3	8	.....	.....	.....	.....	2
Hernia, intestinal obstructions	2	.....	.....	2	.....	.....	.....	.....	.....
Inguinal hernia	2	.....	.....	2	.....	.....	.....	.....	.....
Intestinal obstruction	6	4	1	9	.....	4	.....	.....	2
Other diseases of the intestines	5	1	.....	6	.....	.....	.....	.....	.....
Duodenal ulcer	1	.....	.....	1	.....	.....	1	.....	.....
Acute yellow atrophy of the liver	1	1	1	1	.....	1	.....	.....	.....
Cirrhosis of the liver	16	6	6	15	1	.....	.....	.....	1
Other diseases of the liver	0	4	.....	3	.....	2	.....	.....	.....
Abscess of liver, (unqualified)	1	.....	.....	1	.....	.....	.....	.....	.....
Abscess of the liver, entamebic	1	.....	1	.....	.....	.....	.....	.....	.....
Cholecystitis	3	3	5	1	.....	.....	.....	.....	.....
Simple peritonitis (nonpuerperal)	3	8	.....	10	1	1	.....	.....	2
<i>Nonvenereal diseases of the genito-urinary system and annexa.</i>									
Acute nephritis	25	23	3	45	.....	14	9	4	5
Bright's disease (chronic nephritis)	86	58	21	120	3	.....	1	1	1
Other diseases of the kidney and annexa	2	.....	.....	2	.....	1	.....	.....	.....
Pyelo-nephrosis	5	1	1	5	.....	2	1	.....	.....
Cystitis	1	.....	.....	1	.....	.....	.....	.....	.....
Diseases of the urethra, urinary abscess, etc.	1	.....	.....	1	.....	.....	.....	.....	.....
Diseases of the prostate	2	.....	2	.....	.....	.....	.....	.....	.....
Hypertrophy of prostate	1	.....	.....	1	.....	.....	.....	.....	.....
Uterine tumor (noncancerous)	.....	1	.....	1	.....	.....	.....	.....	.....
Cysts and other tumors of the ovary	.....	1	.....	1	.....	.....	.....	.....	.....
Salpingitis and other diseases of the female genital organs	.....	5	1	4	.....	.....	.....	1	.....
<i>The puerperal state.</i>									
Accidents of pregnancy	.....	2	.....	2	.....	.....	.....	.....	.....
Extra-uterine pregnancy	.....	1	.....	1	.....	.....	.....	.....	.....
Puerperal hemorrhage	.....	7	1	6	.....	.....	.....	.....	.....

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
	1						3		1	4
	2	2	1				5			5
				1			1		1	2
	1	1					2	1		1
1	2	1	3				2	2	3	7
		1	2				10			10
					1		1			1
							1	3		4
							131	34	6	171
							9	2		11
1	1	2	1	3			9	4	3	16
		1		1			3	1		4
							1			1
1		1					2			2
1	5	1		2			5	3	3	11
	2						1	1		2
1		1					2			2
1		2	1				4	3	3	10
	3	2	1				5	1		6
									1	1
	1						2			2
3	2	6	7	2	1		16	6		22
			3				3	2		5
		1							1	1
			1					1		1
1	3	1		1			4	1	1	6
2	4	1		1			7	4		11
6	6	1		2	1		40	7	1	48
12	30	35	25	26	13		95	35	14	144
				1			1	1		2
3							4	1	1	6
				1			1			1
	1						1			1
			1	1			2			2
				1			1			1
	1						1			1
			1				1			1
	4						2	1	2	5
2							1	1		2
1								1		1
1	5	1					4	1	2	7

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE THE AND PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>The puerperal state.—Continued.</i>									
Puerperal septicemia.....		4		4					
Puerperal albuminuria and convulsions.....		2		2					1
Eclampsia.....		8		8					1
<i>Diseases of the skin and of the cellular tissue.</i>									
Gangrene.....	5			5					
Raynaud's disease.....		1		1					
Carbuncle.....		1	1						
Phlegmon and cellulitis.....	1	4	1	4		3			
<i>Diseases of the bones and of the organs of locomotion.</i>									
Mastoid abscess.....	1			1					
Osteomyelitis.....		1		1					
Periostitis.....		1		1				1	
Arthritis.....	1	1		2					
<i>Malformations.</i>									
Congenital malformations (still birth not included).....	6	6	1	10	1	9	2	1	
<i>Diseases of early infancy.</i>									
Congenital debility, icterus, and sclerema.....	3	6	1	8		9			
Premature birth.....	41	16	13	43	1	57			
Congenital debility.....	6	1	1	6		7			
Atrophy of infants.....	4			4		3	1		
Malnutrition.....	26	31	1	56		45	12		
Other casues peculiar to early infancy (including various consequences of labor).....	22	8	3	25	1	30			
<i>Old age.</i>									
Senility.....	7	5	1	11					
<i>Affections produced by external causes.</i>									
Suicide by poisoning.....	2		2						
Suicide by hanging or strangulation.....	2			2					1
Suicide by drowning.....	1			1					
Suicide by firearms.....	7		4	3					1
Suicide by cutting or piercing instruments.....	1			1					
Suicide by crushing.....	1		1						
Other suicides.....	1			1					
Poisoning by food.....		1		1			1		
Other acute poisonings.....	3		2	1			2		
Venomous bites and stings.....	1			1					

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
2	2						2	1	1	4
	1						2			2
5	2						5	2	1	8
	2	2	1				3	1	1	5
					1		1			1
		1						1		1
1		1					4		1	5
1							1			1
	1						1			1
									1	1
	1	1						2		2
							7	1	4	12
							5	4		9
							35	14	8	57
							2	3	2	7
							2	2		4
							13	15	29	57
							21	5	4	30
			2	5	5		12			12
1		1					2			2
1							2			2
	1							1		1
4	2						3	1	3	7
1							1			1
1							1			1
		1					1			1
							1			1
1							1		2	3
			1				1			1

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years)			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>Affections produced by external causes.—Continued.</i>									
Conflagration.....	4	5		9			1		
Burns (conflagration excepted).....	3	4	1	6		1	3	1	1
Accidental drowning.....	10	1	5	6				1	2
Traumatism by firearms.....	3		1	2					1
Traumatism by fall.....	4	2	3	3			1		
Traumatism by machines.....	1		1						
Traumatism by other crushings.....	8		2	6				2	1
Railroad traumatism.....	2		1	1					
Electricity (lightning excepted).....	1			1					1
Homicide by firearms.....	4		1	3					
Homicide by cutting or piercing instruments.....	1	2		3					
Homicide by other means.....	2		1	1					
Fractures (cause not specified).....	1	1		2				1	
Other external violence.....	5		2	3		1	1		
<i>Ill-defined diseases:</i>									
Ill-defined organic disease.....	1			1					
Sudden death.....		1	1						
Cause of death not specified or ill-defined.....	13	15	1	26	1	6	9	3	2
Infections of undetermined origin.....	3	1		3	1		2		
Totals.....	1,127	851	268	1,685	25	473	238	43	73

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
1	1					6	1	8		9
1							5	1	1	7
2	5	1					4		7	11
	1					1	1	1	1	3
	2	1		2			4	1	1	6
	1								1	1
	3	1	1				2	2	4	8
2							1		1	2
							1			1
1	2					1	2		2	4
							1	2		3
3							1		1	2
2								2		2
	1									2
1	2						2	1	2	5
1							1			1
			1				1			1
4	1	2				1	15	8	5	28
2							4			4
244	337	216	164	132	41	17	1,279	445	254	1,978

TABLE IV-A.—DEATHS

Cause of death.	Sex.		Color.		Less than 1 year.
	M.	F.	W.	B.	
Typhoid fever.....		1		1	
Malaria.....	1			1	
Malarial fever, estivoautumnal.....		1		1	
Dysentery, entamebic.....	1			1	
Pyemia.....	2			2	
Septicemia.....	1	1	1	1	
Tetanus.....	1			1	
Pellagra.....		1		1	
Tuberculosis of the lungs.....	15	5	4	16	
Potts disease.....	1		1		
Disseminated tuberculosis.....	1		1		
Syphilis, tertiary.....	2			2	
Cancer of the stomach or liver.....	4	1	3	2	
Cancer of other organs.....	3		2	1	
Diabetes.....	1			1	
Anemia.....	1		1		
Pneumococcus meningitis.....	1			1	
Locomotor ataxia.....	1		1		
Apoplexy.....	1	1		2	1
Tumor of the brain.....	1		1		
Acute endocarditis.....	1		1		
Malignant endocarditis.....	1			1	
Organic diseases of the heart.....	4	3		7	
Aneurysm.....	1		1		
Arterio-sclerosis.....	2		1	1	
Embolism and thrombosis.....	1			1	
Disease of thyroid body.....		1		1	
Hemorrhage, disease of circulatory system.....	1			1	
Broncho-pneumonia.....	1	1	1	1	
Lobar-pneumonia.....	6	3		9	
Pleurisy.....	1			1	
Pulmonary congestion.....	1		1		
Gangrene of the lungs.....	1			1	
Ulcer of the stomach.....	1		1		
Disease of the stomach.....	1			1	
Diarrhea and enteritis.....	2			2	1
Ankylostomiasis.....	2		1	1	
Acute appendicitis.....	2		1	1	
Cirrhosis of the liver.....	4			4	
Abscess of the liver.....	1			1	
Acute nephritis.....	1	2		3	
Chronic nephritis.....	13	4	3	14	
Pyelo-nephrosis.....	1			1	
Disease of uterus.....		1	1		
Abortion.....		1		1	
Premature birth.....	1		1		1
Suicide by poisoning.....		1	1		
Accidental drowning.....	7		3	4	
Traumatism by piercing instrument.....	1			1	
Traumatism by fall.....	2		1	1	
Traumatism by crushing.....	2			2	
Injury by animal.....		1		1	
Electricity (lightning excepted).....	1		1		
Fracture, cause not specified.....	1		1		
Cause of death ill-defined.....	3	2		5	
Infection of undetermined origin.....	1			1	1
Totals.....	106	31	35	102	4

OF NONRESIDENTS.

Age (in years).										Total.
1-4	5-10	11-20	21-30	31-40	41-50	51-60	61-75	76-80	Un- known.	
			1			1				1
					1					1
						1				1
			1			1				1
			1		1					2
			1							2
				1						1
		1	5	8	4	1		1		1
			1							20
				1						1
			1				1			1
							3			2
		1			1		1			5
				1						3
						1				1
			1							1
					1					1
					1					1
			1							2
				1						1
							1			1
										1
										2
										1
										1
										7
		1		3	1	1	1			1
				1						1
						1				2
			1				1			1
										1
										1
										1
										2
										1
										1
										2
										1
										1
										1
										2
										2
										4
										1
										3
										17
		2		4	4	1	5	1		1
						1			1	1
				1						1
										1
					1					1
										1
										7
		1	3	2	1					1
			1							1
			1	1						2
		1					1			2
					1					1
										1
										1
										1
										1
										5
									3	1
4	1	8	34	25	21	17	16	2	4	137

TABLE V.—DEATHS BY NATIONALITY OR NATIVITY, YEAR 1922.

Country.	Employees.		Nonemployees.		Total.		Grand total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Antigua.....			4	4	4	4	8
Africa.....			1	1	1	1	2
Barbados.....	19		126	101	145	101	246
Bahama Islands.....	1		1		2		2
British Guiana.....			2	2	2	2	4
Canada.....			2		2		2
Chile.....			3		3		3
China.....	1		31	5	32	5	37
Colombia.....	2		68	45	70	45	115
Costa Rica.....			4		4		4
Curacao.....			2		2		2
Cuba.....			2		2		2
Demarara.....			4	1	4	1	5
Dominica.....	1			1	1	1	2
Egypt.....			1		1		1
England.....			3		3		3
Ecuador.....			7	1	7	1	8
Fortune Island.....			1	1	1	1	2
France.....			3	4	3	4	7
Finland.....			1		1		1
Germany.....			1		1		1
Grenada.....	1		13	12	14	12	26
Greece.....			5	1	5	1	6
Guadeloupe.....	2		8	8	10	8	18
Haiti.....			3	4	3	4	7
Hungary.....				1		1	1
Italy.....			8	1	8	1	9
India.....			4		4		4
Jamaica.....	19		220	226	239	226	465
Japan.....			2		2		2
Jerusalem.....				1		1	1
Martinique.....	2		28	12	30	12	42
Mexico.....			3			3	3
Montserrat.....	1		3	4	4	4	8
Nassau.....	1			1	1	1	2
Nicaragua.....			6	1	6	1	7
Panama.....	2		360	358	362	358	720
Peru.....			10	3	10	3	13
Porto Rico.....			11	6	11	6	17
Portugal.....				1		1	1
Saint Andrews.....			1	1	1	1	2
Saint Kitts.....	1			1	1	1	2
Saint Lucia.....	2		15	13	17	13	30
Saint Thomas.....	1		2	5	3	5	8
Saint Vincent.....	1		7	3	8	3	11
Switzerland.....				1		1	1
Spain.....	1		18	6	19	6	25
Sweden.....			1		1		1
Trinidad.....	1		17	5	18	5	23
United States.....	11		33	8	44	8	52
Unknown.....	2		10	2	12	2	14
Totals.....	72		1,055	851	1,127	851	1,978

TABLE VI.—STATISTICS RE AMERICAN EMPLOYEES AND THEIR FAMILIES.

	Annual death rate per 1,000 population.
White employees from the United States:	
Disease.....	3.27
External causes.....	1.23
Totals.....	4.50
White women and children from the United States:	
Disease.....	2.70
External causes.....	
Total.....	2.70
White employees from the United States and their families:	
Disease.....	2.91
External causes.....	.46
Total.....	3.37
Number of American children born on Isthmus during the year 1922.....	140
Deaths among American children under 1 year of age.....	4
Infant mortality rate among American children (number of deaths per 1,000 births).....	26.84

TABLE VII.—BIRTHS AND BIRTH RATES IN THE CANAL ZONE, AND THE CITIES OF PANAMA AND COLON.

Place.	Average population.	Births.			Rate per 1,000 population.		
		Total.	Alive.	Still-born.	Total.	Alive.	Still-born.
Year, 1922:							
Panama.....	60,068	2,162	2,058	104	35.99	34.26	1.73
Colon.....	31,393	810	759	51	25.80	24.18	1.62
Canal Zone.....	31,098	722	691	31	23.22	22.22	1.00
Totals.....	122,559	3,694	3,508	186	30.14	28.62	1.52
Year, 1921:							
Panama.....	60,500	2,311	2,173	138	38.20	35.92	2.28
Colon.....	28,789	969	919	50	33.66	31.92	1.74
Canal Zone.....	31,377	807	776	31	25.72	24.73	.99
Totals.....	120,666	4,087	3,868	219	33.87	32.06	1.81

TABLE VIII.—INFANT MORTALITY RATES IN THE CANAL ZONE AND THE CITIES OF PANAMA AND COLON.

Place.	Average population.	Births.			Deaths among children under 1 year of age.	Death rate per 1,000 births.
		Male.	Female.	Total.		
Year, 1922:						
Panama.....	60,068	1,093	965	2,058	303	147.23
Colon.....	31,393	381	378	759	106	139.66
Canal Zone.....	31,098	334	357	691	64	92.62
Totals.....	122,559	1,808	1,700	3,508	473	134.83
Year, 1921:						
Panama.....	60,500	1,101	1,072	2,173	378	173.95
Colon.....	28,783	453	466	919	128	139.28
Canal Zone.....	31,377	380	396	776	75	96.65
Totals.....	120,666	1,934	1,934	3,868	581	150.21

TABLE IX.—DEATHS OF INFANTS BY CAUSE.

Cause of death.	Sex.		Color.		—1 week.	+1 week —1 month.
	M.	F.	W.	B.		
Malaria.....		1		1		
Malarial fever, estivoautumnal.....	1			1		
Diphtheria and croup.....	1			1		
Dysentery, bacillary.....		1		1		
Erysipelas.....	1			1		
Pyemia.....	1			1		
Septicemia.....		1		1		
Tetanus.....	1			1		1
Tuberculosis of the lungs.....	2			2		
Acute miliary tuberculosis.....		1		1		
Tuberculosis meningitis.....	1	1	1	1		
Disseminated tuberculosis.....	1	1		2		
Rickets.....	2	1		3		
Syphilis, secondary.....		1		1		
Syphilis, hereditary.....	5	6		11		1
Acute articular rheumatism.....		1		1		
Anemia, primary, pernicious.....	1	1		2		
Other general diseases.....	1			1		
Simple meningitis.....		2	1	1		
Cerebro-spinal fever.....	1			1		
Convulsions of infants (under 5 years of age).....	2			2		
Otitis media.....	1	3	1	3		
Pericarditis.....	1			1		
Acute endocarditis.....	1		1			
Organic diseases of the heart.....		2		2	1	
Varices.....	1			1	1	
Acute bronchitis.....	15	9	2	22	1	1
Broncho-pneumonia.....	28	23	2	49	2	1
Pneumonia (unqualified).....	1			1		
Lobar pneumonia.....	4	4		8		1
Empyema.....	1			1		
Pulmonary congestion, pulmonary apoplexy.....		1		1		
Other diseases of the respiratory system (tuberculosis excepted).....	2	1	2	1	1	
Acute gastritis.....	2	4	1	5		
Acute indigestion.....	2	1		3		
Diarrhea and enteritis.....	68	54	13	109	1	7
Colitis.....	7	1		8	1	
Intestinal obstruction.....	2	2		4		
Acute yellow atrophy of the liver.....	1		1			
Other diseases of the liver.....	1	1		2		
Acute nephritis.....	7	7	1	13	5	
Other diseases of the kidney and annexa.....	1			1		
Pyelo-nephrosis.....	2			2		
Phlegmon and cellulitis.....	1	2		3		
Congenital malformations (stillbirth not included).....	4	5	1	8	7	1
Congenital debility, icterus, and sclerema.....	3	6	1	8	4	
Premature birth.....	41	16	12	45	47	6
Congenital debility.....	6	1	1	6	3	1
Atrophy of infants.....	3			3		
Malnutrition.....	19	27	1	45	1	1
Other causes peculiar to early infancy (including var- ious consequences of labor).....	21	9	3	27	25	5
Burns (conflagration excepted).....		1		1		
Other external violence.....	1		1			
Cause of death not specified or ill-defined.....	3	3		6	1	
Totals.....	271	202	46	427	101	26

SEX, COLOR, AGE, AND PLACE OF RESIDENCE.

Age (by months).											Place of residence.			
1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Panama	Colon.	Canal Zone.	Total.
		1									1			1
		1									1			1
										1		1		1
						1					1			1
				1								1		1
							1						1	1
								1					1	1
	1		1									1		1
							1					2		2
										2	1	1		2
1							1	1	1		2		1	3
1												1		1
2			1	1	1		2	1	2		6	3	2	11
								1			1			1
			1							1	2			2
				1									1	1
					1		1				2			2
						1					1			1
	2										1		1	2
									1		1	1		1
1			2			1					1	1	2	4
1												1		1
			1								1			2
											2			1
2		2	1	3	3		4	2	3	2	11	10	3	24
4	6	3	4	2	1	7	6	7	2	6	43	8		51
1											1			1
1	1			1	1	3					2	3	3	8
										1	1			1
		1										1		1
		1							1				1	3
1				1	2	1	1				6			6
1								1			1	2		3
12	12	13	12	6	5	13	8	7	14	12	97	21	4	122
1	1	1		1	1		1		2		8	1		9
			1		2			1			2	1	1	4
					1						1			1
			1				1				2			2
3	1		2			1		1		1	12	2		14
					1						1			1
						1				1	1	1		2
		1	1					1			3			3
						1					5	1	3	9
1	2		1	1							5	4		9
2	1	1									34	15	8	57
		2							1		2	3	2	7
			1					1	1		1	2		3
5	4	2	9	2	2	5	3	1	3	8	10	13	23	46
											21	5	4	30
								1			1			1
1				1	2					1	1			1
											5		1	6
40	31	29	39	22	24	34	33	28	30	36	303	106	64	473

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases.</i>								
Typhoid fever.....			4					
Typhoid prophylaxis.....								
Typhus fever.....			5					
Relapsing fever.....			3					
Malaria:								
Malarial fever, Estivoautumnal.....	28	4	65					
Malarial fever, Tertian.....	15	3	20					
Malarial fever, Quartan.....	1							
Malarial fever, mixed.....			1					
Malarial fever, undetermined.....		1						
Malarial fever, Clinical.....	2		1					
Smallpox.....								
Measles.....			1	1				
Scarlet fever.....								
Whooping cough.....								
Diphtheria and croup.....	1							
Croup.....								
Diphtheria bacillus carrier.....								
Influenza.....	13	4	7					
Dysentery, entamebic.....			1					
Dysentery, bacillary.....			1					
Leprosy.....								
Erysipelas.....	8		4					
Dengue.....								
Chicken pox.....	1		16	1				
Mumps.....			2	1				
Yaws.....								
Filariasis.....								
Other epidemic diseases.....								
Purulent infection and septicemia.....	4		2					
Pyemia.....								
Pyemia and septicemia, pneumococcic.....								
Tetanus.....								
Mycosis.....								
Pellagra.....							1	
Beriberi.....								
Tuberculosis of the lungs.....	4	2	13				6	
Acute miliary tuberculosis.....								
Tuberculous meningitis.....			1					
Abdominal tuberculosis.....			1					
Pott's disease.....			1					
Tuberculosis of bones and joints.....			1					
Tuberculosis of other organs.....			1					
Tuberculosis of the larynx.....							1	
Tuberculosis of the lymph glands.....								
Tuberculosis of the genito-urinary organs.....								

THE PANAMA CANAL

HEALTH DEPARTMENT

BALBOA HEIGHTS, C. Z.,

MARCH 12, 1924.

The following are corrections to the Annual Report of
the Health Department for the calendar year 1922.

H. C. FISHER,
Chief Health Officer.



TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS OF THE PANAMA CANAL FOR THE YEAR 1922.

Diseases.	Employees.						Nonemployees.						Total discharges.	Total deaths.			
	Discharges.			Deaths.			Discharges.			Deaths.							
							White.			White.			Deaths.				
										Black.			White. Black.				
							Army & Navy			Army & Navy							
							Others.			Others.							
	M.	F.		M.	F.		M.	F.		M.	F.		M.	F.	M.	F.	
<i>General diseases.</i>																	
Typhoid fever.....			4						4	2				3		13	3
Typhoid prophylaxis.....								1					1			1	
Typhus fever (Erroneously reported as relapsing fever.....)			1													4	
Malaria:								2									
Malarial fever, Estivoautumnal.....	28	4	70	106	20	13	32	37	1	2	1	2	9			319	7
Malarial fever, Tertian.....	15	3	22	46	13	6	21	21			1		7	1		156	1

The balance of the table is correct as printed in report.

SANTO TOMAS HOSPITAL—PANAMA

TABLE XXI-A.—SHOWING NUMBER OF CASES OF DISEASES DISCHARGED AND DIED YEAR OF 1922.

	Dis- charged.	Died.
Typhoid fever.....	1	
Malaria, unqualified.....	280	2
Malarial fever, estivoautumnal.....	230	5
Malarial fever, clinical.....	91	
Smallpox.....	4	
Measles.....	61	
Scarlet fever.....	15	
Diphtheria and croup.....	137	4
Influenza.....	20	1
Dysentery, unqualified.....	45	4
Dysentery, entamebic.....	41	4
Leprosy.....	2	
Erysipelas.....	12	
Chickenpox.....	34	
* * * * *		
Cancer and other malignant tumors of the breast.....	3	2
* * * * *		
Page 116.		
Organic diseases of the brain.....	5	
* * * * *		
Arterio-sclerosis.....	14	
* * * * *		
Page 117.		
Biliary calculi.....	13	1
* * * * *		
Stricture of the urethra, non-venereal.....	57	2
* * * * *		
Page 118.		
Suicide by asphyxia.....		2
Suicide by firearms.....		1
* * * * *		
Accidental drowning.....		1
* * * * *		
Homicide by other means.....		1

The table is correct except as noted above.



Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Army & Navy	Others.				Army & Navy	Others.				White.	Black.	White.	Black.						
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
			4	2				1	2	3								13	3
1																		1	
7		1	1	1														15	
8			1	2						1								15	
99	20	12	31	36	1	1	2	1	2	9								304	7
40	13	6	20	19				1		7	1	1						145	1
		2																3	
5		1	2							1	2							11	1
		1																2	
5		1		1						1								11	
	1	2	3	1						1								8	
	5	1	6	3						1	1							19	
	4	5	1	1						1								10	
										1									1
3	5	7	5	13						1								34	1
	1																	1	
1				1														2	
20	4	4	2	5						10								69	
3	1	1		1				1		2								9	1
1			2			2			1									4	3
			5															5	
1		1		2														16	
	1									1								2	
1	5	4	12	9						2		2						53	
2																		5	
1				1						1								1	
1																		3	
1																		1	
		2		2					1	1								11	1
			1					1										1	1
									2									1	1
																		1	1
																		1	1
				7						5			1					1	7
						1				4								5	6
16	4	1	4	11			1	3		6	12		1					68	16
									1	3								3	3
		1	1	1						1								2	2
																		3	1
3			2	1											1			7	1
1			1	1			1											4	1
																		1	1
1			1															1	1

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases.—Continued.</i>								
Disseminated tuberculosis.....							4	
Rickets.....								
Syphilis, primary.....								
Syphilis, secondary.....	2		4					
Syphilis, tertiary.....	2		53	1	1		1	
Syphilis, cerebro-spinal.....	1		15					
Syphilis, hereditary.....			1					
Syphilis, period not stated.....			1					
Gonococcus infection.....			2					
Gonorrhea.....	9		54					
Gonorrheal arthritis.....	1							
Gonorrheal orchitis and epididymitis.....	1	1	3					
Gonorrheal ophthalmia.....								
Soft chancre.....	4	33						
Adenitis chancroidal.....			1					
Cancer and other malignant tumors of the buccal cavity.....	1						1	
Cancer and other malignant tumors of the stomach and liver.....			1				1	
Cancer and other malignant tumors of the peritoneum, intestines, rectum.....					1			
Cancer and other malignant tumors of the female genital organs.....								
Cancer and other malignant tumors of the breast.....		1						
Cancer and other malignant tumors of the skin.....								
Cancer and other malignant tumors of other organs and of organs not specified.....					3		2	
Other tumors (tumors of the female genital organs excepted).....	1							
Acute articular rheumatism.....	1		1					
Chronic rheumatism and gout.....								
Gout.....								
Arthritis deformans.....								
Diabetes.....	2							
Glycosuria.....								
Exophthalmic goitre.....								
Hodgkin's disease.....								
Anemia, chlorosis.....								
Anemia, primary, pernicious.....							1	
Anemia, secondary, cause not determined.....								
Other general diseases.....			7					
Serum disease.....								
Alcoholism, acute.....	3		2					
Alcoholism, chronic.....	1							
Alcoholic psychosis.....								

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases—Continued.</i>								
Other chronic occupational poisonings.....								
Other chronic poisonings.....		1						
Drug habit.....								
<i>Diseases of the nervous system and of the organs of special sense.</i>								
Encephalitis.....								
Simple meningitis.....	1							
Locomotor ataxia.....	1		1					
Other diseases of the spinal cord.....			1					
Acute anterior polio-myelitis.....								
Cerebral hemorrhage, apoplexy.....			1		1		5	
Softening of the brain.....							1	
Paralysis without specified cause.....							1	
General paralysis of the insane.....	2		2				3	
Other forms of mental alienation.....	1							
Dementia precox.....		1	5					
Manic depressive psychosis.....								
Toxic psychosis.....			1					
Epilepsy.....			1					
Convulsions (nonpuerperal) (5 years and over).....			1					
Convulsions of infants (under 5 years of age).....								
Hysteria.....	1				1			
Neuralgia.....			1					
Neuritis.....	10		8					
Other diseases of the nervous system.....	1							
Imbecility.....								
Organic disease of the brain.....	1		1					
Tumor of the brain.....			1					
Neurasthenia.....	3				1			
Diseases of the eyes and their annexa.....	3	1	25		1			
Follicular conjunctivitis.....			5					
Trachoma.....								
Cornea.....	5		13					
Iris.....	1		1					
Lens.....	1		3					
Fundus.....			1					
Diseases of the ears.....	1							
Otitis, external.....	1	1	2					
Otitis media.....	2		3		1			
Otitis, internal.....								

Nonemployees.										Nonresidents.										Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.					Deaths.						
White.			Black.		White.			Black.		White.			Black.		White.			Black.			
Army and Navy.	Others.				Army and Navy.	Others.				Army and Navy.	Others.				Army and Navy.	Others.					
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.				
		1																1			
1		2										1						4			
	1																	2			
		1						1	1		1							1	1		
				1				1	1		1							3	3		
1		1				1												3			
	1	2																2	2		
				1	1			1	3		3							7	10		
1				2					1		1							2	2		
	2			1		1		3	1		1	1				1		5			
6	1	4	7	16						4								7	9		
19	5	4	23	25						2	2	1						39			
		2		6						1								87			
																		9			
	1																	1			
	1			4	4					1		1	1					14			
			2							1								4			
			1					1	2									1	3		
8		3		8														21			
2		2		1														6			
3		2	2							1								26			
5	1	4	2	2						2				1				17	1		
			2	2									2					4			
			3								1							6			
		1						1										2	1		
9	1	4		2														20			
27	4	3	7	25							1							97			
4		1	4	3						3		1						21			
1																		1			
9	2		4	12						1		1						47			
6		1		5						1		1						16			
1				8														13			
2												1						4			
			1	1						1								4			
25	3	6	1	1						5								46			
35	8	11	12	6				1		2								80			
2	2	1	1	1					1	1								8	1		

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the circulatory system.</i>								
Pericarditis.....			1					
Acute endocarditis.....			1				1	
Organic diseases of the heart.....	1		14		1		7	
Angina pectoris.....	1		1					
Diseases of the arteries, atheroma, aneurysm, etc.....	1							
Aneurysm.....							2	
Arterio-sclerosis.....	1		3				1	
Embolism and thrombosis.....			1		2			
Other diseases of the veins.....	3		1					
Hemorrhoids.....	15	1	14					
Varices.....			1	1				
Varicocele.....	2		1					
Phlebitis.....	1							
Diseases of the lymphatic system (lymphangitis etc.).....	4		3					
Lymphadenitis (nonvenereal).....	11		20					
Hemorrhage; other diseases of the circulatory system.....	2		1					
<i>Diseases of the respiratory system.</i>								
Diseases of the nasal fossæ.....	15	7	18	1				
Adenoid vegetations.....								
Myiasis of nasal fossæ and sinuses.....		1						
Diseases of the larynx.....			2					
Laryngitis.....	1							
Diseases of the thyroid body.....	1	1	1					
Acute bronchitis.....	11		26					
Chronic bronchitis.....	4							
Broncho-pneumonia.....							1	
Pneumonia (unqualified).....								
Lobar pneumonia.....			10				1	
Pleurisy.....	1	2	2					
Empyema.....							1	
Pulmonary congestion, pulmonary apoplexy.....			1					
Gangrene of the lungs.....								
Asthma.....	5		3					
Pulmonary emphysema.....								
Other diseases of the respiratory system (tuberculosis excepted).....			1					
Abscess of lungs.....	1							
<i>Diseases of the digestive system.</i>								
Diseases of the mouth and annexa.....								
Diseases of the teeth and gums.....	1	1	12					
Stomatitis.....								

OF THE PANAMA CANAL FOR THE YEAR 1922.—Continued.

Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Army and Navy.	Others.				Army and Navy.	Others.													
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
1	1			1					1									1	1
1	5	4	1	9		1		1	1	4				2				4	1
2		1								1								6	14
1									1									3	1
3	1			1		1			1									2	3
				7														15	2
7		2		1	1				1									2	4
44	3	5	1	4						3								90	
																		2	
25										2								30	
																		1	
	3	1	2	2						1								16	
47	7	4	8	6						9		1						113	
2				3														8	
73	6	12	4	10						5								156	
	13	15	23	31						1								83	
1										1								3	
		2																4	
	3	1	1	3					2									9	2
1		2					1			1								7	1
23	20	23	25	26					1	11		2						167	1
4	2	3		1						2		2						18	
	2	1	7	5				3	4	2								17	8
			1	1														2	
5	2	1	18	13		1		8	8	5		2		1				56	19
8	2	1	1	7				1		4								28	1
								1											2
									1									1	1
																			1
4	2	1	2	2						1								19	
1	1	1																4	
	1								1										
								1	1									3	
																		1	2
4	1		3									1						9	
4	1	9	1	6						1								36	
		2	1	3				1	1	3								9	

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the digestive system.—Continued.</i>								
Diseases of the pharynx.....	1		11					
Pharyngitis.....	1		1					
Follicular tonsillitis.....	18	5	20					
Diseases of the esophagus.....			1					
Foreign body in the esophagus.....								
Stricture of the esophagus.....			1					
Ulcer of the stomach.....		1	2				2	
Other diseases of the stomach (cancer excepted).....	5		1					
Acute gastritis.....	3		4					
Chronic gastritis.....	3			1				
Acute indigestion.....	2		3					
Diarrhea and enteritis (under 2 years).....								
Colitis (under 2 years).....								
Diarrhea and enteritis (2 years and over).....	2	1	9					
Colitis (2 years and over).....	3		2					
Ankylostomiasis.....			6					
Intestinal parasites.....			1					
Ascariasis.....								
Teniasis.....	1							
Strongyloidosis.....								
Appendicitis and typhlitis.....								
Acute appendicitis.....	10	2	5				2	
Chronic appendicitis.....	14	6	4					
Hernia, intestinal obstructions.....			2					
Inguinal hernia.....	13		40					
Other hernias.....								
Intestinal obstruction.....	2		2				1	
Other diseases of the intestines.....	9	4	2					
Constipation.....	13	2	9	3				
Duodenal ulcer.....	5		2		1			
Acute yellow atrophy of the liver.....								
Cirrhosis of the liver.....	1		1				1	
Biliary calculi.....		1						
Other diseases of the liver.....	6	1						
Abscess of the liver, entamebic.....			2				1	
Cholecystitis.....			2					
Diseases of the spleen.....								
Simple peritonitis (nonpuerperal).....							1	
Other diseases of the digestive system (cancer and tuberculosis excepted).....	2		3					
<i>Nonvenereal diseases of the genito-urinary system and annexa.</i>								
Acute nephritis.....			2					
Bright's disease (chronic nephritis).....	5		18				3	

OF THE PANAMA CANAL FOR THE YEAR, 1922.—Continued.

Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Army and Navy.	Others.				Army and Navy.	Others.													
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
13	4	6	1	10				1	4								46		
105	45	65	38	91					8								8		
1	1																2		
1	4	3						1	2								1		
1	1	6							3								13		
6	1	9	3	2					3		1						17		
3		2		1					3								32		
4	1	4							1	1							12		
	4	1	2	1				3	1								14		
	5	6	5	10		1		1									8		
3	1	3	2	7				1	2	2							26		
3	5	5	7	11						3							30		
4	2		2	5						1		1					39		
		2	1							1							21		
	1	1	1	1							2						5		
																	6		
				1													1		
																	1		
1																	1		
94	7	15	2	3	1			1	1	12	1						151		
34	6	22	1	6						3		2					98		
										1							3		
28	6	2	14	4						13	1	1					125		
3	1	1	2	4						1							12		
					1			2	1								4		
5	6	5	4	8					1	3	2	1					4		
7		9	4	14						7							49		
3								1		1							68		
											1						11		
	1																1		
		4		1							1						4		
22	3	4	1				1			4							7		
						1											41		
																	2		
2		2		1						1							8		
2	1		1	2					2	2			1				1		
1				8													8		
																	14		
1	3	5	3	3					1	1							18		
1	2	2	1	8		1	1	3	2	1							38		

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Nonvenereal diseases of the genito-urinary system and annexa.—Continued.</i>								
Other diseases of the kidney and annexa.....	3		2	1				
Pyelo-nephrosis.....		1	3					
Calculi of the urinary passages.....	5		3					
Diseases of the bladder.....	1	2	3					
Cystitis.....	1	2	7	1				
Diseases of the urethra, urinary abscess, etc.....	2		5					
Stricture of the urethra, nonvenereal.....	1		16					
Diseases of the prostate.....								
Acute prostatitis.....	1		1					
Chronic prostatitis.....	1							
Abscess of the prostate.....			1					
Hypertrophy of prostate.....								
Nonvenereal diseases of the male genital organs.....	5		17					
Hydrocele.....	3		12					
Uterine hemorrhage (nonpuerperal).....								
Uterine tumor (noncancerous).....				4				
Other diseases of the uterus.....		2						
Metritis.....				2				
Cysts and other tumors of the ovary.....								
Salpinxitis and other diseases of the female genital organs.....		1		6				
Nonpuerperal diseases of the breast (cancer excepted).....								
Benign tumor of breast.....								
<i>The puerperal state.</i>								
Normal labor.....								
Accidents of pregnancy.....								1
Extra-uterine pregnancy.....								
Hyperemesis gravidarum.....								
Abortion.....				1				
Puerperal hemorrhage.....								
Other accidents of labor.....								
Puerperal septicemia.....								
Puerperal albuminuria and convulsions.....								
Eclampsia.....								
Puerperal plegmatia alba dolens, embolus, sudden death.....								
Following childbirth (not otherwise defined).....								
Puerperal diseases of the breast.....								

OF THE PANAMA CANAL FOR THE YEAR, 1922.—Continued.

Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Army and Navy.	Others.				Army and Navy.	Others.													
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
10	5	13	3	16				2		1	1					55	2		
3				2		1		1	1	1	1					10	3		
5	4	2		2						5						26			
2		2		2								1				13			
4	1	10		6						1		1				34			
2		1	1	1						2						14			
4	1		3	1								1				27			
										1						1			
1																3			
	1															2			
1																2			
										1						1			
8	6		12							4						52			
2	1		1							6						25			
		6		2												8			
		2		27								1				34			
		28		55								3				88			
		1		2								1				6			
		5		4												9			
									2							98	2		
		17		71								3							
		1		5												6			
1		2		2												5			

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the skin and of the cellular tissue.</i>								
Gangrene.....			3					
Furuncle.....	2		1					
Carbuncle.....	6		1					
Acute abscess.....	9		18					
Phlegmon and cellulitis.....	6		15					
Scabies.....			1					
Pemphigus contagiosa.....			1					
Myiasis of skin.....	1							
Dhobie itch.....			1					
Ulcer of the skin.....	2		9	1				
Oriental sore (Leishmaniosis).....								
Impetigo contagiosa.....	1		1					
Urticaria.....								
Ingrowing nail.....	1							
Other diseases of the skin and annexe.....	6		6					
<i>Diseases of the bones and of the organs of locomotion.</i>								
Diseases of the bones (tuberculosis excepted).....	1	4	4					
Caries (nontuberculous).....			1					
Mastoid abscess.....								
Osteomyelitis.....	2		2					
Periostitis.....			1					
Diseases of the joints (tuberculosis and rheumatism excepted).....								
Ankylosis.....								
Arthritis.....			12	1				
Synovitis.....	3	1	2					
Other diseases of the organs of locomotion.....	15	5	12	2				
<i>Malformations.</i>								
Congenital malformations (stillbirth not included).....			3					
<i>Diseases of early infancy.</i>								
Newborn child.....								
Congenital debility, icterus, and sclerema.....								
Premature birth.....								
Congenital debility.....								
Atrophy of infants.....								
Malnutrition.....								
Other causes peculiar to early infancy (including various consequences of labor).....								
Lack of care.....								

OF THE PANAMA CANAL FOR THE YEAR, 1922.—Continued.

Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Army and Navy.	Others.				Army and Navy.	Others.													
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
1			1							2								2	
4	3	2								2								16	
		1					1			2								10	1
20	8	7	9	16						6		2						95	
13		3	5	1			1			4		1						48	1
1				2						2								6	
1										1								2	
										2								3	
3										1								5	
1			3	8						1								25	
	1																	1	
		2	1	1														6	
			1															1	
1	1	2																5	
10	11	5	4	8				1		5		1						56	1
4	1	6	1	2						1								24	
1																		2	
1	2	2	2															7	
1	1		1					1		1								8	1
1		1						1										3	1
2			2															4	
			2	1														3	
8	1		1	9						3								35	
6	1																	13	
20	2	8	7	5						5	1							82	
15	12	1	31	1	1	1	1	3	2									65	5
	105	117	89	92														403	
			1	1														2	
	1	3	3			4		7	2									7	13
		1						1										1	1
	1							2										1	2
	5	4	21	9	1		8	9										39	18
		1	1	1	1	1	1	1										3	3
		1																1	

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Old age.</i>								
Senility.....	1							
Senile dementia.....								
<i>Affections produced by external causes.</i>								
Suicide by poisoning.....				1				
Suicide by cutting or piercing instruments.....								
Poisoning by food.....	7	2	14	1				
Other acute poisonings.....	2		4					
Conflagration.....								
Burns (conflagration excepted).....	4		7					
Absorption of deleterious gases (conflagration excepted).....			2					
Traumatism by firearms.....	1							
Traumatism by cutting or piercing instruments.....	3		27					
Traumatism by fall.....	8		49		1			
Traumatism by machines.....	1		3					
Traumatism by other crushings.....	2	1	23					
Railroad traumatism.....			2					
Injuries by animals.....				1				
Starvation.....	1							
Heat exhaustion.....								
Electricity (lightning excepted).....			1					
Homicide by firearms.....			1					
Homicide by cutting or piercing instruments.....			1					
Fractures (cause not specified).....	5	1	12					
Dislocations.....	1		1					
Sprains.....	1		7					
Other external violence.....	10	1	88					
<i>Ill-defined diseases.</i>								
Sudden death.....	1							
Cause of death not specified or ill-defined.....	1	1	4					
Infections of undetermined origin.....	1		13	2				
No disease.....	9	2	13	1				
Totals.....	479	82	1131	40	11		53	

[illegible]

TABLE XI.—CONSOLIDATED HOSPITAL AND ASYLUM REPORT.

(A. = White Americans; F. = White foreigners; B = Black.)

	Remain- ing January 1, 1922.			Admitted.			Died.			Discharged.		
	A.	F.	B.	A.	F.	B.	A.	F.	B.	A.	F.	B.
Ancon Hospital:												
Employees.....	15	4	49	386	64	976	8	3	39	385	58	902
Army and Navy patients..	53			1,313			6			1,310		
Panama pay patients.....			5		6	28					2	17
Other pay patients.....	41	24	62	965	496	1,485	18	8	97	949	477	1,367
Charity patients.....	8	3	9	186	41	266	3	1	19	188	40	227
Totals.....	117	31	125	2,850	607	2,755	35	12	155	2,832	577	2,513
Corozal Hospital:												
Employees.....	3		24	1	1	8			8	4		15
Army and Navy patients..	3			25						23		
Panama pay patients.....	5	68	202	6	25	68		6	15	10	12	31
Other pay patients.....	4	2	29	8	4	16		1	3	10	4	22
Charity patients.....	1	8	52	2		25				2	4	21
Totals.....	16	78	307	42	30	117		7	26	49	20	89
Grand totals.....	133	109	432	2,892	637	2,872	35	19	181	2,881	597	2,602
Corozal Farm (cripples):												
Employees.....		5	30		3	6					3	9
Chronic ward:												
Charity patients.....		1	24		7	4			3		6	4
Colon Hospital:												
Employees.....	2	1	10	124	10	367			6	104	7	254
Army and Navy patients..	3	1		354	22		4	1		198	11	
Panama pay patients.....			1	1	12	180			11	1	2	46
Other pay patients.....	8	3	10	312	201	684	3	4	45	257	142	451
Charity patients.....	5		1	63	16	166	2		11	62	14	115
Totals.....	18	5	22	854	261	1,397	9	5	73	622	175	866
Palo Seco Leper asylum:												
Panama pay patients.....		6	40		1	6			3			1
Charity.....			32			4			4			4
Totals.....		6	72		1	10			7			5
Grand totals:												5
Employees.....	20	10	113	511	78	1,357	8	3	53	493	68	1,180
Army and Navy patients..	59	1		1,692	22		10	1		1,531	11	
Panama pay patients.....	5	74	248	7	44	282		6	29	11	16	95
Other pay patients.....	53	29	101	1,285	701	2,185	21	13	145	1,216	623	1,840
Charity.....	14	12	118	251	64	465	5	1	37	252	64	371
Totals.....	151	126	580	3,746	909	4,289	44	24	264	3,503	782	3,486

TABLE XI.—CONSOLIDATED HOSPITAL AND ASYLUM REPORT.—Continued.
(A. = White Americans; F. = White foreigners; B. = Black.)

	Trans- ferred.			Remain- ing December 31, 1922.			Average number con- stantly in hospital.			
	A.	F.	B.	A.	F.	B.	A.	F.	B.	Total.
Ancon Hospital:										
Employees.....			12	8	7	72	12.55	4.45	68.65	85.65
Army and Navy patients.....	5			45			75.48			75.48
Panama pay patients.....		3	15		1	1		.40	.79	1.19
Other pay patients.....	9	6	23	30	29	60	34.04	26.49	66.17	126.70
Charity patients.....			17	3	3	12	5.02	1.93	12.18	19.13
Totals.....	14	9	67	86	40	145	127.09	33.27	48.06	308.42
Corozal Hospital:										
Employees.....					1	9	1.71	.15	17.55	19.42
Army and Navy patients.....				5			1.89			1.89
Panama pay patients.....	1	3	3		72	221	5.91	68.68	210.07	284.66
Other pay patients.....				2	1	20	3.33	1.20	26.46	30.98
Charity patients.....		1	2	1	3	54	.41	5.52	40.97	46.91
Totals.....	1	4	5	8	77	304	13.24	75.55	295.06	381.11
Grand totals.....	15	13	72	94	117	449				
Corozal Farm (cripples):										
Employees.....		1			4	27		5.07	28.63	33.70
Chronic ward:										
Charity patients.....					2	21		1.74	23.08	24.83
Colon Hospital:										
Employees.....	22	4	111			6	1.86	.20	6.43	8.49
Army and Navy.....	151	9		4	2		6.07	.39		6.46
Panama pay patients.....		10	122			2		.04	1.00	1.04
Other pay patients.....	57	57	188	3	1	10	5.21	4.74	11.19	21.15
Charity patients.....	4	2	35			6	1.67	.39	2.77	4.83
Totals.....	234	82	456	7	3	24	14.81	5.76	21.41	41.98
Palo Seco Leper Asylum:										
Panama pay patients.....					7	42		6.33	41.30	47.63
Charity.....						28			28.82	28.82
Totals.....					7	70		6.33	70.12	76.45
Grand totals:										
Employees.....	22	5	123	8	12	114	16.12	9.87	121.26	147.26
Army and Navy patients.....	156	9		54	2		83.44	.39		83.83
Panama pay patients.....	1	16	140	1	11	99	5.91	75.45	253.16	334.52
Other pay patients.....	66	63	211	33	102	291	42.58	32.43	103.82	178.83
Charity.....	4	3	54	5	6	87	7.10	9.58	107.82	124.52
Totals.....	249	96	528	101	133	591	155.15	127.72	586.06	868.96

TABLE XII.—CONSOLIDATED DISPENSARY REPORT.

EMPLOYEES TREATED IN QUARTERS.

Place.	Re-main-ing Jan. 1, 1922.		Ad-mitted.		Died.		Dis-charged.		Trans-ferred.		Re-main-ing Dec. 31, 1922.		Days lost.		
	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	Total.
Ancon.....	2	3	716	556	.....	.....	704	532	13	20	1	7	1,700	2,749	4,449
Balboa.....	10	.....	713	87	.....	.....	722	87	.....	.....	1	.....	1,734	432	2,166
Pedro Miguel...	1	126	160	.....	.....	.....	121	142	2	16	3	3	423	703	1,126
Gatun.....	1	87	92	.....	.....	.....	80	81	6	11	1	1	226	396	622
Cristobal....	2	14	396	488	.....	.....	388	467	9	17	1	18	1,263	6,012	7,275
Totals....	14	19	2,038	1,383	.....	.....	2,015	1,309	30	64	7	29	5,346	10,292	15,638

ALL CASES TREATED BUT NOT EXCUSED.

Place.	Employees.			Nonemployees.			Total.		
	White.	Black.	Total.	White.	Black.	Total.	White.	Black.	Total.
Ancon.....	6,959	17,413	24,372	7,401	11,626	19,027	14,360	29,039	43,399
Balboa.....	14,822	10,947	25,769	25,845	5,523	31,368	40,667	16,470	57,137
Pedro Miguel...	4,797	9,364	14,161	7,037	11,295	18,332	11,834	20,659	32,493
Gatun.....	3,333	11,340	14,673	4,599	7,672	12,271	7,932	19,012	26,944
Cristobal.....	5,142	23,335	28,477	7,048	19,573	26,621	12,190	42,908	55,098
Totals.....	35,053	72,399	107,452	51,930	55,689	107,619	86,983	128,088	215,071

TABLE XIII—CONDOLIDATED ADMISSION REPORT.

	White.	Black.	Total.
Admission to hospitals, excluding Corozal farm and chronic ward.....	4,645	4,279	8,924
Admissions of employees to quarters.....	2,038	1,383	3,421
Total admissions to hospitals and quarters.....	6,683	5,662	12,345
Less number of patients transferred between hospitals and from quarters to hospitals, whose admissions are duplicated in the above figures.....	374	592	966
Net admissions to hospitals and quarters.....	6,309	5,070	11,379
EMPLOYEES.			
Employees admitted to hospitals.....	586	1,351	1,937
Employees admitted to quarters.....	2,038	1,383	3,421
Total admissions of employees.....	2,624	2,734	5,358
Less number transferred between hospitals and from quarters to hospitals, whose admissions are duplicated in the above figures.....	56	187	243
Net admissions of employees.....	2,568	2,547	5,115
Annual admission rate per 1,000 employees to hospitals and quarters.....	908.38	334.25	489.61

TABLE XIV.—NUMBER OF EMPLOYEES CONSTANTLY SICK IN HOSPITALS AND QUARTERS.

	White.	Black.	Total.
Hospitals:			
Ancon.....	18.75	84.67	103.42
Colon.....	2.06	6.43	8.49
Totals.....	20.81	91.10	111.91
Quarters:			
Ancon.....	4.66	7.53	12.19
Balboa.....	4.75	1.18	5.93
Pedro Miguel.....	1.16	1.93	3.09
Gatun.....	.62	1.08	1.70
Colon.....	3.46	16.47	19.93
Totals.....	14.65	28.19	42.84

TABLE XV.—AVERAGE NUMBER OF DAYS IN HOSPITALS AND IN QUARTERS
FOR EACH ADMISSION OF SICK EMPLOYEE.

	White.	Black.	Total.
Hospitals:			
Ancon.....	12.77	33.56	26.92
Colon.....	5.45	6.84	6.24
Totals (average).....	11.07	26.41	21.67
Quarters:			
Ancon.....	2.42	5.09	3.58
Balboa.....	2.44	4.97	2.71
Pedro Miguel.....	3.71	4.30	4.04
Gatun.....	2.75	4.71	3.76
Colon.....	3.06	1.47	9.46
Totals (average).....	2.64	9.82	4.95

TABLE XVI.—NUMBER OF DAYS HOSPITAL TREATMENT FURNISHED VARIOUS
CLASSES OF PATIENTS.

Class.	American.	Foreign.	Black.	Total.
Ancon Hospital:				
Employees.....	4,582	1,623	25,056	31,261
Army and Navy patients.....	27,549			27,549
Panama pay patients.....		147	289	436
Other pay patients.....	12,425	9,668	24,152	46,245
Charity patients.....	1,832	706	4,545	7,083
Totals.....	46,388	12,144	54,042	112,574
Corozal Hospital (insane):				
Employees.....	625	55	6,407	7,087
Army and Navy patients.....	689			689
Panama pay patients.....	2,158	25,069	76,674	103,901
Other pay patients.....	1,211	438	9,659	11,308
Charity patients.....	150	2,015	14,956	17,121
Totals.....	4,833	27,577	107,696	140,106
Corozal farm (cripples):				
Employees.....		1,850	10,451	12,301
Chronic ward:				
Charity patients.....		636	8,427	9,063
Colon Hospital:				
Employees.....	678	74	2,348	3,100
Army and Navy patients.....	2,217	142		2,359
Panama pay patients.....	1	14	365	380
Other pay patients.....	1,900	1,732	4,087	7,719
Charity patients.....	610	141	1,013	1,764
Totals.....	5,406	2,103	7,813	15,322
Palo Seco Leper Asylum:				
Panama pay patients.....		2,310	15,075	17,385
Charity patients.....			10,519	10,519
Totals.....		2,310	25,594	27,904

TABLE XVII.—WARD LABORATORY REPORTS.

	Ancon Hospital.	Colon Hospital.	Santo Tomas Hospital.
Blood examinations (total number).....	5,712	2,399	3,530
Estivoautumnal.....	294	201	
Tertian.....	144	116	
Mixed, tertian and estivoautumnal.....	20	3	
Quartian.....	6	3	
Filaria.....	5		
Spirillum of relapsing fever.....	2		
White blood counts.....	2,264	625	849
Red blood counts.....	1,393	25	364
Differential counts.....	992	190	1,587
Hemoglobin estimations.....	3,241	198	634
Crescents.....	2		
Stool examinations (total number).....	9,101	2,059	7,933
Ameba coli.....	34		
Entameba histolytica.....	46	2	
Uncinaria ova.....	728	161	
Ascaris ova.....	273	57	
Tricocephalus dispar.....	518	158	
Bilharzia ova.....	18		
Tinea saginata.....	19	5	
Strongyloides.....	211	68	
Trichuris.....	73		
Oxyuris.....		6	
Ciliated monads (includes cercaromonas hominis and trichomonas vaginalis).....	84	21	
Balantidium coli.....	3		
Pus cells.....	61	80	
Dibothriocephalus latus.....	86	34	
Pus and blood.....	92		
Pus, blood and mucous.....	101	16	
Guaiac test for occult blood.....	165	4	
Urine examinations (total number).....	19,948	4,918	12,714
Acetone.....	963	174	
Diacetic acid.....	39	9	
Albumin.....	4,547	2,268	
Sugar.....	1,302	16	
Bile.....	348	55	
Indican.....			
Guaiac test for occult blood.....	100	7	
Sediment.....	2,608	1,204	
Epithelial cells.....	6,760	1,549	
Cylindroids.....	113	42	
Hyaline casts.....	2,123	457	
Granular casts.....	1,251	663	
Pus casts.....	4,352	21	
Pus cells.....	1,914	3,029	
Red blood corpuscles.....	2,226	1,153	
Pus and blood.....	3,477	7	
Gonococci.....	2		
Tubercle bacilli.....	1		
Hemin crystals.....	346		
Functional kidney tests.....	152	7	14
Sputum (total examinations).....	3,362	900	3,108
Tubercle bacilli.....	296	34	
Spinal fluid (total examinations).....	431	9	48
Smears of sediment.....	91	4	
Pneumococcus.....			11
Cell counts.....	339	7	

TABLE XVII.—WARD LABORATORY REPORTS.—Continued.

	Ancon Hospital.	Colon Hospital.	Santo Tomas Hospital.
Smear examinations (total number).....	1,981	142	5,388
Urethral.....	1,241	64	.....
Vaginal.....	542	52	.....
Eyes.....	47	12	.....
Nasal.....	1	1	.....
Blood.....	.....	.....	76
Throat.....	6	8	1,075
Indican.....	45	.....	.....
Prostatic.....	230	1	.....
Others.....	1	4	49
Widal reactions.....	.....	.....	48
Wassermann tests.....	.....	.....	6,840

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Amputations:					
Arm.....					5
Forearm.....			1		3
Hand.....			1		
Foot.....					3
Leg.....	1				10
Resection of digits, multiple.....	5		3		22
Operations on bones:					
Laminectomy.....	1				4
Craniectomy, decompressive.....	4	1			3
Ostectomy.....	4		2		3
Resection of coccyx.....	1				
Resection of shoulder.....					4
Resection of wrist.....					2
Resection of knee.....					2
Reduction of fracture, simple.....	18				
Reduction of fracture, compound.....	1				
Wiring of fractures, simple.....	10				9
Wiring of fractures, compound.....					4
Intermedullary splint for fracture.....	1				
Lane plate, tibia.....	1				
Removal of Lane plate.....	1				
Intra-med. splint, femur, bone peg.....	1				
Bunion excision.....	3				
Adenectomy:					
Cervical.....	7				30
Inguinal, single.....	155		1		196
Inguinal, double.....	33				69
Femoral.....	10		1		10
Axillary.....	5		4		2
Herniotomy:					
Inguinal, single.....	76		26		113
Inguinal, double.....	19		10		24
Ventral.....	11		2		26
Combined.....					1
Strangulated.....	2		1		6
Femoral.....	1				2
Genito-urinary tract:					
Nephropexy.....	4				1
Cystotomy.....					2
Urethrotomy, internal.....	8				40
Urethrotomy, external.....	6				22
Varicocele, radical cure.....	23				4
Hydrocele, single, radical cure.....	22		5		28
Hydrocele, double, radical cure.....	7				9
Orchidectomy.....	2		1		9
Epididymotomy.....	62		4		10
Vasectomy.....	3				3
Amputation of scrotum.....	10		1		3
Amputation of penis.....					6
Curettage uteri.....	161		12		122
Perineoplasty.....	20		1		4
Nephrectomy.....	1				6
Nephrotomy.....	3	1			
Vaginal section.....					14
Trachelorrhaphy.....	11		1		4
Vaginal puncture.....	5		2		5
Circumcision.....	186				
Transplantation of testicle.....			1		
Perinephritic abscess, drainage of.....	2				4

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.—Continued.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Obstetrical:					
Cesarian section.....	2		1		4
Mid forceps.....	2				
High forceps.....	2				11
Low forceps.....	7		10		76
Version.....	3		9	2	44
Perineorrhaphy.....	19				22
Thorax:					
Excision of breast.....	1				2
Excision of breast and axilla.....	2				
Thoracotomy.....	10	1			8
Pneumothoracotomy.....	1				
Stab wound of chest.....					1
Rectum:					
Hemorrhoids, radical cure.....	78		26		63
Fistula in ano, excision of.....	1		7		28
Prolapsus rectum, radical cure.....					6
Pilonidal cyst.....			1		
General:					
Thyroidectomy.....	9	1	1		3
Varicose veins, excision of.....	6				2
Tenorrhaphy.....	6		5		3
Myorrhaphy.....			1		
Excision of surface neoplasms.....	1		4		15
Excision of tongue.....					2
Operation for stab wounds of soft parts.....	1		6		1
Operation for gunshot wounds of soft parts.....	3	1	3		8
Operation for extensive injuries to soft parts.....	4	1	10		8
Plastic operations for congenital defects.....	6				2
Plastic operations for effects of disease.....	9		1		7
Skin graft.....	1				1
Laparotomy:					
For general peritonitis.....	2	1	2	2	
Tuberculous peritonitis.....	1				1
Intestinal obstruction.....	3	1	1	1	2
Exploratory.....	18	1			33
Gastro-enterostomy.....	4				13
Gastrotomy.....					2
Enterectomy.....	4	2	1		
Appendectomy.....	164		98		286
Appendectomy with local peritonitis.....	16	1	15		1
Appendectomy with general peritonitis.....	8	2	6	3	5
Colostomy.....	2	1			1
Cholecystotomy.....	1		1		5
Cholecystostomy.....	6				3
Cholecystectomy.....	4				18
Abscess, intrapelvic.....			1		
Abscess of liver, laparo-hepatotomy.....	5	1			3
Abscess of liver, thoraco-hepatotomy.....					1
Pan-hysterectomy.....	1		5		8
Splenectomy.....	1	1			13
Supravaginal hysterectomy.....	32	2	6		44
Hysteromyomectomy.....	9		7		3
Myomectomy.....	1				39
Salpingectomy, single.....	20		2		108
Salpingectomy, double.....	6		2		
Salpingo-oophorectomy.....	12		16		63
Ovarian cystectomy.....	8		1		11

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.—Continued.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Laparotomy—Concluded:					
Oophorectomy.....	8	.....	4	.....	66
Plastic operation for chronic peritonitis.....			7	1	.....
Suspensio-uteri.....	68	.....	15	.....	97
Ectopic gestation.....	9	.....	2	.....	5
General peritonitis.....					1
Enterorrhaphy.....	1	.....			.....
Gunshot wound of abdomen.....					1
Trauma, general peritonitis.....			1	1	.....
Plaster casts.....	10	.....			.....
Cauterizations.....	160	.....			.....
Arsphenamine intravenous.....	2,378	.....			.....
Blood transfusions.....	2	.....			.....
Stab wound, abdomen.....					1
Major operations, various.....	24	.....			32
Minor operations, various.....	1,563	.....	168	.....	721
Salvarsan.....			542	.....	2,323
Totals.....	5,632	19	1,068	10	5,076

TABLE XIX—REPORT OF EYE AND EAR DEPARTMENT,
ANCON HOSPITAL.

	Ancon Hospital.
Eye:	
Advancement.....	7
Cataract extraction.....	7
Combined.....	5
Linear.....	2
Chalazion, removal.....	25
Enucleation.....	5
Foreign body removal.....	39
Hordeolum, incision.....	11
Iridectomy.....	5
Lachrymal operations.....	1
Dilation of ducts.....	4
Dissection of sac.....	1
Lid operations:	
Expression of lids.....	3
Plastic.....	1
Needling.....	1
Paracentosis.....	1
Pteryguim.....	34
Tenotomy.....	4
Minor.....	3
Ear:	
Furnicle, incision.....	5
Foreign body, removal.....	5
Mastoid operation, simple.....	11
Paracentesis.....	31
Polypi, removal.....	1
Nose:	
Cauterization.....	3
Foreign body, removal.....	3
Plastic.....	2
Polypi, removal.....	6
Rhinoplasty.....	8
Sinuses:	
Ethmoid, simple.....	9
Frontal, simple.....	7
Frontal, radical.....	4
Maxillary, puncture and irrigation.....	15
Maxillary, radical.....	3
Maxillary, drainage.....	1
Submucous resection.....	75
Tubinectomy.....	15
Minor.....	3
Pharynx:	
Adenoidectomy.....	247
Peritonsillar abscess, incision.....	36
Tonsillectomy.....	461
Uvulectomy.....	1
Minor.....	15
Larynx:	
Abscess, incision.....	1
Esophageal examination.....	2
Foreign body, removal.....	2
Trachea:	
Foreign body, removal.....	1
Tracheotomy.....	2
Totals.....	<u>1,134</u>
Refraction.....	<u>1,506</u>

TABLE XX—REPORT OF X-RAY DEPARTMENT, ANCON HOSPITAL AND SANTO TOMAS HOSPITAL.

	Ancon Hospital.	Santo Tomas Hospital.
Arm.....	28	27
Arm and forearm.....	116	.....
Abdomen.....	.....	22
Chest.....	303	.....
Dental.....	636	34
Elbow.....	78	48
Fluoroscopy.....	32	.....
Foot and ankle.....	187	34
Urinary bladder.....	110	10
Gastro intestinal tract.....	217	5
Hand.....	180	.....
Head.....	66	25
Hip.....	53	12
Jaw.....	54	16
Kidney.....	.....	2
Knee.....	116	36
Leg.....	120	41
Liver and gall bladder.....	26	5
Lung.....	.....	10
Neck.....	.....	117
Pelvis.....	41	2
Shoulder.....	87	38
Sinuses.....	87	12
Spine.....	79	7
Stomach.....	.....	48
Thigh.....	26	19
Treatments.....	81	163
Mastoids.....	42	.....
Wrist.....	85	29
Others.....	.....	29

PLATES USED.

6½ x 8½.....	221	54
8 x 10.....	1,835	209
10 x 12.....	610	.....
11 x 14.....	.....	61
14 x 17.....	46	.....
Dental films.....	2,098	60
8 x 10 films.....	418	19
10 x 12 films.....	1,576	116
14 x 17 films.....	1,180	77

TABLE XXI.—SANTO TOMAS HOSPITAL.

PATIENTS TREATED.

Class.	Remaining Dec. 31, 1921.	Admit- ted.	Died.	Dis- charged.	Remaining Dec. 31, 1922.
Pay cases.....	21	905	30	863	33
Charity cases.....	279	8,499	741	7,694	343
Totals.....	300	9,404	771	8,557	376

Class.	Number treated.	American.		Other nations.	
		White.	Black.	White.	Black.
Pay cases.....	926	11	.....	590	325
Charity cases.....	8,778	21	.....	2,533	6,224
Totals.....	9,704	32	.....	3,123	6,549

Number of days relief furnished patients.....	111.004
Average number of patients constantly in hospital.....	333
Average number of days treatment for each patient admitted.....	8

DISPENSARY REPORT.

Class.	White.	Black.	Total.
Natives treated.....	2,100	3,128	5,228
Foreigners treated.....	407	2,185	2,592
Totals.....	2,507	5,313	7,820

TABLE XXI-A—SHOWING NUMBER OF CASES OF DISEASES DISCHARGED AND DIED,
YEAR OF 1922.

	Dis- charged.	Died.
<i>General diseases.</i>		
General diseases.....	1	
Relapsing fever.....	280	2
Malaria.....	230	5
Malarial fever, undetermined.....	91	
Hemoglobinuric fever, malarial.....	4	
Vaccinia.....	61	
Measles.....	15	
Whooping cough.....	137	4
Croup.....	20	1
Cholera nostras.....	45	4
Dysentery.....	41	4
Erysipelas.....	12	
Chicken pox.....	34	
Other epidemic diseases.....	73	
Purulent infection and septicemia.....	36	1.5
Tetanus.....	1	2
Mycosis.....	3	
Pellagra.....	10	11
Beriberi.....	5	
Tuberculosis of the lungs.....	107	172
Acute miliary tuberculosis.....	1	2
Tuberculous meningitis.....		3
Abdominal tuberculosis.....	2	
Pott's disease.....	5	
White swellings.....	2	
Tuberculosis of other organs.....	16	1
Disseminated tuberculosis.....		10
Rickets.....	3	
Syphilis, primary.....	230	7
Syphilis, secondary.....	61	2
Syphilis, tertiary.....	384	20
Gonococous infection.....	297	
Gonorrhea.....	81	
Soft chancre.....	230	
Adentis chancroidal.....	31	
Cancer and other malignant tumors of the buccal cavity.....	5	3
Cancer and other malignant tumors of the stomach, liver, esophagus, and pharynx.....	4	8
Cancer and other malignant tumors of the peritoneum, intestines, rectum.....	4	2
Cancer and other malignant tumors of the female genital organs.....	30	6
Cancer and other malignant tumors of the breast.....	8	2
Cancer and other malignant tumors of the skin.....	2	
Cancer and other malignant tumors of other organs and of organs not speci- fied.....	13	6
Other tumors (tumors of the female genital organs excepted).....	17	
Acute articular rheumatism.....	14	
Chronic rheumatism and gout.....	10	
Diabetes.....	11	
Leukemia.....		1
Anemia, chlorosis.....	4	1
Other general diseases.....	30	
Alcoholism.....	35	
Other chronic poisonings.....	4	
<i>Diseases of the nervous system and of the organs of special sense.</i>		
Simple meningitis.....	2	5
Pneumococcus meningitis.....	1	3
Locomotor ataxia.....	4	
Other diseases of the spinal cord.....	4	1
Cerebral hemorrhage, apoplexy.....	12	13

TABLE XXI-A—SHOWING NUMBER OF CASES OF DISEASES DISCHARGED AND DIED,
YEAR OF 1922.—Continued.

	Dis- charged.	Died.
<i>Diseases of the nervous system and of the organs of special sense.—Continued.</i>		
Softening of the brain.....		1
Paralysis without specified cause.....	22	
Other forms of mental alienation.....	54	
Epilepsy.....	26	
Convulsions, nonpuerperal, 5 years and over.....	1	
Chorea.....	1	
Hysteria.....	14	
Neuralgia.....	2	
Neuritis.....	2	
Other diseases of the nervous system.....	14	
Chronic diseases of the brain.....	5	
Diseases of the eye and their annexa.....	95	
Diseases of the ear.....	25	
Otitis media.....	6	1
<i>Diseases of the circulatory system.</i>		
Pericarditis.....		3
Acute endocarditis.....	1	1
Organic diseases of the heart.....	65	48
Angina pectoris.....	1	
Diseases of the arteries, atheroma, etc.....	14	6
Aneurysm.....	4	1
Aterio-sclerosis.....	14	
Embolism and thrombosis.....		1
Diseases of the veins.....	54	
Diseases of the lymphatic system.....	108	
Hemorrhage; other diseases of the circulatory system.....	3	3
<i>Diseases of the respiratory system.</i>		
Diseases of the nasal fossae.....	10	
Diseases of the larynx.....	1	
Laryngitis.....	2	
Diseases of the thyroid body.....	3	1
Acute bronchitis.....	61	1
Chronic bronchitis.....	28	5
Broncho-pneumonia.....	63	14
Lobar pneumonia.....	65	47
Pleurisy.....	13	3
Empyema.....	2	
Pulmonary congestion, pulmonary apoplexy.....		2
Asthma.....	18	
Other diseases of the respiratory system (tuberculosis excepted).....		1
<i>Diseases of the digestive system.</i>		
Diseases of the mouth and annexa.....	28	
Diseases of the pharynx.....	93	
Follicular tonsillitis.....	65	
Ulcer of the stomach.....	6	
Other diseases of the stomach (cancer excepted).....	65	3
Diarrhea and enteritis, under 2 years.....	34	33
Diarrhea and enteritis, 2 years and over.....	23	5
Colitis, 2 years and over.....	5	
Ankylostomiasis.....	246	1
Intestinal parasites.....	70	1
Appendicitis and typhlitis.....	140	3
Chronic appendicitis.....	32	
Hernia, intestinal obstructions.....	94	6

TABLE XXI-A—SHOWING NUMBER OF CASES OF DISEASES DISCHARGED AND DIED,
YEAR OF 1922.—Continued.

	Dis- charged.	Died.
<i>Diseases of the digestive system.—Continued.</i>		
Inguinal hernia.....	42	2
Constipation.....	59	1
Duodenal ulcer.....	1	.....
Cirrhosis of the liver.....	28	10
Diliary calculi.....	13	1
Other diseases of the liver.....	15	3
Cholecystitis.....	3	.....
Diseases of the spleen.....	3	3
Abscess of the spleen.....	1	.....
Simple peritonitis, nonpuerperal.....	1	10
Other diseases of the digestive system (cancer and tuberculosis excepted).....	2	.....
<i>Nonvenereal diseases of the genito-urinary system and annexa.</i>		
Acute nephritis.....	24	22
Bright's disease (chronic nephritis).....	153	77
Other diseases of the kidney and annexa.....	10	.....
Calculi of the urinary passages.....	1	.....
Diseases of the bladder.....	33	.....
Cystitis.....	1	.....
Diseases of the urethra, urinary abscess, etc.....	12	.....
Stricture of the urethra, nonvenereal.....	57	2
Diseases of the prostate.....	5	.....
Nonvenereal diseases of the male genital organs.....	34	.....
Hydrocele.....	3	.....
Uterine hemorrhage, nonpuerperal.....	11	1
Uterine tumor, noncancerous.....	50	1
Other diseases of the uterus.....	109	.....
Metritis.....	8	.....
Cysts and other tumors of the ovary.....	17	.....
Salpingitis and other diseases of the female genital organs.....	200	.....
Nonpuerperal diseases of the breast, cancer excepted.....	23	.....
<i>The puerperal state.</i>		
Normal labor.....	871	.....
Accidents of pregnancy.....	162	1
Hyperemesis gravidarum.....	2	.....
Abortion.....	50	.....
Puerperal hemorrhage.....	7	2
Other accidents of labor.....	30	1
Puerperal septicemia.....	1	2
Puerperal albuminuria and convulsions.....	4	2
Eclampsia.....	.....	1
Following childbirth, not otherwise defined.....	2	.....
Puerperal insanity.....	1	.....
<i>Diseases of the skin and of the cellular tissue.</i>		
Gangrene.....	5	4
Furuncle.....	13	.....
Acute abscess.....	157	2
Phlegmon and cellulitis.....	4	.....
Scabies.....	25	.....
Filaria medinensis.....	1	.....
Ulcer of the skin.....	149	.....
Other diseases of the skin and annexa.....	23	.....

TABLE XXI-A—SHOWING NUMBER OF CASES OF DISEASES DISCHARGED AND DIED,
YEAR OF 1922.—Continued.

	Dis- charged.	Died.
<i>Diseases of the bone and of the organs of locomotion.</i>		
Diseases of the bone, tuberculosis excepted.....	10	.....
Mastoid abscesses.....	6	1
Diseases of the joints (tuberculosis and rheumatism excepted).....	22	.....
Arthritis.....	1	.....
Other diseases of the organs of locomotion.....	14	1
<i>Malformations.</i>		
Congenital malformations (stillbirths not included).....	71	4
<i>Diseases of early infancy. (Less than one year of age).</i>		
Newborn child.....	862	.....
Icterus and scleroma.....	6	56
Premature birth.....	1	.....
Congenital debility.....	6	8
Other causes peculiar to early infancy, including various consequences of labor.....	.....	13
Lack of care.....	2	.....
<i>Old age.</i>		
Senility.....	17	1
Senile dementia.....	1	1
<i>Affections produced by external causes.</i>		
Suicide by asphyxia.....	2	.....
Suicide by firearms.....	1	.....
Poisoning by food.....	1	.....
Other acute poisonings.....	14	1
Burns, conflagration excepted.....	26	2
Accidental drowning.....	1	.....
Traumatism by firearms.....	27	.....
Traumatism by cutting or piercing instruments.....	103	4
Traumatism by fall.....	27	1
Traumatism in mines and quarries.....	3	.....
Traumatism by machines.....	6	2
Traumatism by other crushings.....	20	1
Injuries by animals.....	2	1
Starvation.....	1	.....
Electricity, lightning excepted.....	5	.....
Homicide by other means.....	1	.....
Fractures, cause not specified.....	109	3
Dislocations.....	1	.....
Other external violence.....	112	.....
<i>Ill-defined diseases.</i>		
Ill-defined organic diseases.....	2	.....
Cause of death not specified or ill-defined.....	.....	1
No disease.....	71	.....
Feigned disease.....	148	.....

TABLE XXII.—COROZAL HOSPITAL—STATEMENT OF COMMITMENTS AND DISCHARGES.

COMMITMENTS.

	Male.	Female.
From Canal Zone:		
First admission.....	51	12
Second admission.....	3	1
Private pay.....	1	3
From Panama:		
First admission.....	51	46
Second admission.....	3	7
Third admission.....	2	
Fourth admission.....	1	
Seventh admission.....	1	
Totals.....	113	69

DISCHARGES.

Place of birth	Well.		Improved.		Unimproved.	
	Male.	Female.	Male.	Female.	Male.	Female.
Antigua.....			2	2	1	
Barbados.....	7	5	12	6	4	5
Colombia.....	1		2			
Corsica.....					1	
Costa Rica.....					1	
China.....					1	
Ecuador.....			1			
England.....	1				2	1
Fortune Island.....	1					
Grenada.....	1					
Guadeloupe.....	1					
Jamaica.....	4	4	5	5	3	4
Japan.....					1	
Montserrat.....	1		2			
Nicaragua.....			1			
Panama.....	4	7	3	8	5	3
Porto Rico.....			1			
Scotland.....	1					
Spain.....					1	
St. Kitts.....			2	1	1	
St. Lucia.....	1					
Turkey.....				1		
United States.....	3	2	5	1	19	
Venezuela.....					1	
Totals.....	26	18	36	24	41	13

TABLE XXIII.—FORCE REPORT.

	December 31, 1922.			1921.	1920.
	Gold.	Silver.	Total.		
Chief Health Office.....	4		4	3	3
Medical Storehouse.....				8	8
Quarantine Service.....	9	22	31	35	44
Health Office, Panama.....	7	144	151	155	121
Health Office, Colon.....	8	78	86	94	159
Ancon Hospital.....	138	209	347	329	360
Colon Hospital.....	23	34	57	56	60
Santo Tomas Hospital.....	6		6	7	7
Palo Seco Leper Colony.....	1	34	35	31	50
Zone sanitation.....	4	90	94	116	143
Corozal Hospital and Farm.....	16	88	104	104	98
Dispensaries.....	9	8	17	20	19
Totals.....	225	707	932	958	1,072

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